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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R8–ES–2021–0108; FF09E21000 FXES1111090FEDR 223]

RIN 1018–BE90

Endangered and Threatened Wildlife and Plants; Foothill Yellow-Legged Frog; Threatened Status with Section 4(d) Rule for Two Distinct Population Segments and Endangered Status for Two Distinct Population Segments

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to list four of six distinct population segments (DPSs) of the foothill yellow-legged frog (*Rana boylii*), a stream dwelling amphibian from Oregon and California, under the Endangered Species Act of 1973 (Act), as amended. This determination also serves as our 12-month finding on a petition to list the foothill yellow-legged frog. After a review of the best scientific and commercial information available, we find that listing the South Sierra and South Coast DPSs as endangered and the North Feather and Central Coast DPSs as threatened is warranted. Accordingly, we propose to list these four DPSs under the Act, with the South Sierra and South Coast DPSs listed as endangered species, and the North Feather and Central Coast DPSs listed as threatened species. Our proposal to list the North Feather and Central Coast DPSs as threatened species also includes a rule issued under section 4(d) of the Act for each of these two DPSs. If we finalize this proposed rule for these four DPSs, we will then add them to the List of Endangered and Threatened Wildlife and extend the Act's protections to them. We have determined that designation of critical habitat for these four DPSs is not determinable at this time. We have also determined that

the North Coast DPS (in Oregon and northern California) and the North Sierra DPS (in Yuba, Sierra, Nevada, and Placer Counties, California) of the foothill yellow-legged frog do not warrant listing at this time.

DATES: We will accept comments received or postmarked on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES**, below) must be received by 11:59 p.m. Eastern Time on the closing date. We must receive requests for a public hearing, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may submit comments by one of the following methods:

(1) *Electronically*: Go to the Federal eRulemaking Portal: *http://www.regulations.gov*. In the Search box, enter the docket number or RIN for this rulemaking (presented above in the document headings). For best results, do not copy and paste either number; instead, type the docket number or RIN into the Search box using hyphens. Then, click on the Search button. On the resulting page, in the Search panel on the left side of the screen, under the Document Type heading, check the Proposed Rule box to locate this document. You may submit a comment by clicking on "Comment."

(2) *By hard copy*: Submit by U.S. mail to: Public Comments Processing, Attn: FWS–R8–ES–2021–0108, U.S. Fish and Wildlife Service, MS: PRB/3W, 5275 Leesburg Pike, Falls Church, VA 22041–3803.

We request that you send comments only by the methods described above. We will post all comments on *http://www.regulations.gov*. This generally means that we will post any personal information you provide us (see **Information Requested**, below, for more information).

FOR FURTHER INFORMATION CONTACT: Michael Fris, Field Supervisor, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Sacramento, CA 95825; telephone 916–414–6700. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, a species warrants listing if it meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become endangered in the foreseeable future throughout all or a significant portion of its range). If we determine that a species warrants listing, we must list the species promptly and designate the species' critical habitat to the maximum extent prudent and determinable. We have determined that the South Sierra and South Coast DPSs meet the definition of an endangered species and the North Feather and Central Coast DPSs meet the definition of threatened species; therefore, we are proposing to list them as such. We have determined that designation of critical habitat for these four DPSs is not determinable at this time. We have determined that listing the North Coast and North Sierra DPSs is not warranted at this time. Both listing a species as an endangered or threatened species and designating critical habitat can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process.

What this document does. We propose to list two DPSs as endangered species (South Sierra and South Coast DPSs) and two DPSs as threatened species (North Feather and Central Coast DPSs) under the Act. We also propose a rule under section 4(d) of the Act for each of those DPSs we are proposing to list as threatened species.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species because of any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We have determined that the following threats are driving the status of the foothill yellow-legged frog: altered hydrology (largely attributable to dams, water diversions, channel modifications), nonnative species, and the effects of climate change (exacerbating drought, high-severity wildfire, extreme flood conditions). Other threats currently impacting the species include disease and parasites, agriculture (including pesticide drift), mining, urbanization (including development and roads) and recreation.

Section 4(a)(3) of the Act requires the Secretary of the Interior (Secretary) to designate critical habitat concurrent with listing to the maximum extent prudent and determinable. Due to a court-ordered settlement agreement for completing our 12-month finding for the species, we have not been able to obtain the necessary economic information needed to develop a proposed critical habitat designation for the foothill yellow-legged frog. Therefore, we find that designation of critical habitat for this species is currently not determinable. Once we obtain the necessary economic information, we will propose a critical habitat designation for the species.

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from other governmental agencies, Native American Tribes, the scientific community, industry, or any other interested parties concerning this proposed rule.

We particularly seek comments concerning:

(1) The species' biology, range, and population trends, including:

(a) Biological or ecological requirements of the species, including habitat requirements for feeding, breeding, and sheltering;

(b) Genetics and taxonomy;

(c) Historical and current range, including distribution patterns, and the locations of any additional populations of this species;

(d) Historical and current population levels, and current and projected population trends; and

(e) Past and ongoing conservation measures for the species and its habitat and their effectiveness.

(2) Factors that may affect the continued existence of the species, which may include habitat modification or destruction, overutilization, disease, predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors.

(3) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to this species and existing regulations that may be addressing those threats.

(4) Information on regulations that are necessary and advisable to provide for the conservation of the foothill yellow-legged frog and that the Service can consider in developing a 4(d) rule for the species. In particular, we seek information concerning the extent to which we should include any of the Act's section 9 prohibitions in the 4(d) rule or whether we should consider any additional exceptions from the prohibitions in the 4(d) rule.

(5) The reasons why we should or should not designate habitat as "critical habitat" under section 4 of the Act (16 U.S.C. 1531 *et seq*.), including information to inform the following factors that the regulations identify as reasons why designation of critical habitat may be not prudent:

(a) The species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat to the species;

(b) The present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or threats to the species' habitat stem solely from causes that cannot be addressed through management actions resulting from consultations under section 7(a)(2) of the Act;

(c) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States; or

(d) No areas meet the definition of critical habitat.

(6) Specific information on:

(a) The amount and distribution of foothill yellow-legged frog habitat; and

(b) What areas, which are either (i) occupied at the time of listing and that contain the physical or biological features essential to the conservation of the species and which may require special management considerations or protection; or (ii) unoccupied at the time of listing and are essential for the conservation of the species, and would, with reasonable certainty, contribute to the conservation of the species.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include. Please note that submissions merely stating support for, or opposition to, the action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act directs that determinations as to whether any species is an endangered or a threatened species must be made "solely on the basis of the best scientific and commercial data available."

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**.

If you submit information via *http://www.regulations.gov*, your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on *https://www.regulations.gov*.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on *https://www.regulations.gov*.

Because we will consider all comments and information we receive during the comment period, our final determinations may differ from this proposal. Based on the new information we receive (and any comments on that new information), we may conclude that the appropriate listing status for any of the four DPSs is different than our determinations identified in this proposal, including the possibility that one or more of the DPSs may not warrant listing as either endangered or threatened. In addition, we may change the parameters of the prohibitions or the exceptions to those prohibitions in the 4(d) rule if we conclude it is appropriate in light of comments and new information we receive. For example, we may expand the prohibitions to include prohibiting additional activities if we conclude that those additional activities are not compatible with conservation of the species. Conversely, we may establish additional exceptions to the prohibitions in the final rule if we conclude that the activities would facilitate or are compatible with the conservation and recovery of the species.

Public Hearing

Section 4(b)(5) of the Act (16 U.S.C. 1531 et seq.) provides for a public hearing on this proposal, if requested. Requests must be received by the date specified in **DATES**. Such requests must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule a public hearing on this proposal, if requested, and announce the date, time, and place of the hearing, as well as how to obtain reasonable accommodations, in the *Federal Register* and local newspapers at least 15 days before the hearing. For the immediate future, we will provide these public hearings using webinars that will be announced on the Service's website, in addition to the *Federal Register*. The use of these virtual public hearings is consistent with our regulations at 50 CFR 424.16(c)(3).

Previous Federal Actions

On July 11, 2012, we received a petition from the Center for Biological Diversity to list 53 species of reptiles and amphibians, including the foothill yellow-legged frog, as endangered or threatened under the Act. On July 1, 2015, we published our finding that the petition presented substantial scientific or commercial information indicating that listing the foothill yellow-legged frog may be warranted based on impacts to the species' habitat (Factor A) and other natural or humanmade factors (Factor E)(80 FR 37568).

On August 30, 2016, we entered into a settlement agreement with the Center for Biological Diversity to complete our 12-month finding on the foothill yellow-legged frog by September 30, 2020. We subsequently requested and received an extension of our deadline to submit the 12-month finding on the species to the *Federal Register* by December 15, 2021. This document fulfills our obligation under the settlement agreement to complete a 12-month finding on the foothill yellow-legged frog.

Supporting Documents

A species status assessment (SSA) team prepared an SSA report for the foothill

yellow-legged frog (Service 2021, entire). The SSA team was composed of Service biologists, in consultation with other species experts. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species. In accordance with our joint policy on peer review published in the *Federal Register* on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review of listing actions under the Act, we sought and received the expert opinions of three appropriate specialists regarding the SSA. We also sent the SSA report to numerous Federal, State, Tribal, and private partners and stakeholders, including scientists with expertise in foothill yellow-legged frog ecology, river ecology, amphibian genetics, population modeling, and public land management, for review. We received comments from 12 of these partners including representatives from the U.S. Department of Agriculture's U.S. Forest Service (Forest Service), U.S. Geological Survey (USGS), Bureau of Land Management (BLM), National Park Service, Oregon Department of Fish and Wildlife (ODFW), California Department of Forestry and Fire Protection (CalFire), and researchers from the University of California at Los Angeles. We did not receive comments from any Tribal entities. Comments and feedback from partners and peer reviewers were incorporated into the SSA report as appropriate and have informed this proposed rule. A copy of the SSA report can be found on *www.regulations.gov* at Docket No. FWS–R8–ES–2021–0108.

I. Proposed Listing Determination

Background

Below is a brief description of the foothill yellow-legged frog, its habitat, distribution, and taxonomy; for a thorough discussion of the ecology and life history of the species, please see the SSA report (Service 2021, Chapter 2, pp. 14–33).

The foothill yellow-legged frog is a small- to medium-sized stream-dwelling frog with fully webbed feet and rough pebbly skin. Coloring of the species is highly variable but is usually light and dark mottled gray, olive, or brown, with variable amounts of brick red. The foothill yellow-legged frog is a stream-obligate species. Stream habitat for the species is highly variable and keyed on flow regimes. The historical range of the foothill yellow-legged frog extended from the Willamette River drainage in Oregon south through the Sierra Nevada Mountains to the Transverse Range, and down along the California Coast Range to at least the Upper San Gabriel River in Los Angeles County, California. The current distribution of the foothill yellow-legged frog generally follows the historical distribution of the species except with range contractions in the southern and, to a lesser extent, northern parts of the species' range.

Taxonomy

The foothill yellow-legged frog currently retains its classification as *Rana boylii*, ascribed in 1854 by S. F. Baird (Baird 1854, p. 62; Frost 2019, unpaginated). Prior to1955, the foothill yellow-legged frog was part of a grouping of two Ranid subtaxa that occurred in Oregon and California. The two subtaxa were subsequently revised as two separate individual taxa in 1955 and identified as *Rana boylii* (foothill yellow-legged frog) and *Rana muscosa* (mountain yellow-legged frog) (Zweifel 1955, pp. 210, 273). The foothill yellow-legged frog is now the only entity classified as *Rana boylii* (Zweifel 1968, pp. 71.1–71.2).

Genetic Information

Subsequent to receipt of the petition to list the foothill yellow-legged frog as a singular species, investigations into genetic differences among populations of the foothill yellow-legged frog have delineated the species into six currently identified genetic clades (Peek 2018, entire). A clade is a group of organisms that includes a common biological ancestor and all the lineal descendants. Two rangewide assessments of foothill yellow-

legged frog genomic datasets revealed that the species is extremely differentiated following biogeographical boundaries (McCartney-Melstad *et al.* 2018, p. 112; Peek 2018, p. 76). The foothill yellow-legged frog has deeper population structure (stratification or separation between populations) than that observed in any other anuran (i.e., frogs, toads, and tree frogs) with similar data (McCartney-Melstad *et al.* 2018, p. 112). The California Department of Fish and Wildlife (CDFW) in their recent status determination classified the foothill yellow-legged frog as having six unique, genetic clades (i.e., lineages) (CDFW 2019b, pp. 4, 13). Additional information regarding the genetic clades can be found in the SSA report (Service 2021, pp. 19–21). The six separate genetic clades are identified as the North Coast, North Feather, North Sierra, South Sierra, Central Coast, and South Coast clades in our analysis.

Distinct Population Segment Evaluation

Under the Act, the term species includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature (16 U.S.C. 1532(16)). To guide the implementation of the distinct population segment (DPS) provisions of the Act, we and the National Marine Fisheries Service (National Oceanic and Atmospheric Administration—Fisheries), published the Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act (DPS Policy) in the *Federal Register* on February 7, 1996 (61 FR 4722). Under our DPS Policy, we use two elements to assess whether a population segment under consideration for listing may be recognized as a DPS: (1) The population segment's discreteness from the remainder of the species to which it belongs, and (2) the significance of the population segment to the species to which it belongs. If we determine that a population segment being considered for listing is a DPS, then the population segment's conservation status is evaluated based on the five

listing factors established by the Act to determine if listing it as either endangered or threatened is warranted.

Under the Act, we have the authority to consider for listing any species, subspecies, or, for vertebrates, any DPS of these taxa if there is sufficient information to indicate that such action may be warranted. Based on the information available regarding potential discreteness and significance for the species, we determined it was appropriate to review the status of the foothill yellow-legged frog by first conducting a DPS analysis for the species.

Discreteness

Under our DPS Policy, a population segment of a vertebrate taxon may be considered discrete if it satisfies either of the following conditions: (1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation; or (2) it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.

For the foothill yellow-legged frog, we examined recent genetic information and distribution of the species' populations as our means of determining discreteness for potential DPSs.

There is substantial evidence that the foothill yellow-legged frog is biogeographically divided into multiple clades with little or no gene flow between the clades. Earlier studies provided strong evidence that there are deep genetic divisions in this taxon (Dever 2007, pp. 168–173; Lind *et al*. 2011, pp. 269–284; Peek 2010, entire). Subsequent, more in-depth and larger-scale genetic studies (McCartney-Melstead *et al*. 2018, entire; Peek 2018, entire) confirmed the certainty and depth of the phylogenetic

(evolutionary history) structural divisions of the foothill yellow-legged frog using population genomics (comparison of DNA sequences of populations).

The results of the first study (McCartney-Melstead *et al*. 2018, entire), which used several different analytical approaches, all supported extremely differentiated clades in a spatially cohesive pattern, and identified five reciprocally monophyletic clades (where each clade shares more-recent common ancestors from one clade than it shares with any other clade) associated with five different geographic regions (identified herein as the North Coast, Central Coast, South Coast, North Sierra, and South Sierra clades) (McCartney-Melstead *et al*. 2018, p. 112).

The second genomic study (Peek 2018, entire) provided additional geographic and genetic resolution to clade divisions by examining genetic samples from 1,103 individual foothill yellow-legged frogs across the extant range of the species and provided greater coverage of localities in the northern Sierra Nevada range (Peek 2018, pp. 52–53). Like the earlier study, multiple analytical methods were used to quantify genetic structure. The study largely confirmed the five clades described by previous research (McCartney-Melstead *et al*. 2018, entire), but also identified another discrete group between the North Sierra and North Coast clade that is identified herein as the North Feather clade (Peek 2018, pp. 63–64). The extensive genomic data available for this species, which are both more reliable and more informative than morphological data, demonstrate discrete patterns of biogeographical discontinuity across the taxon's range.

Some of the geographical boundaries that delineate the foothill yellow-legged frog clades are fairly certain because of clear physical barriers, such as the separation between the Sierra Nevada and Coastal clades due to the Central Valley of California, the San Francisco Bay between the North Coast and the Central Coast clades, or the separation of the Central Coast and South Coast clades due to the Salinas Valley. However, physical separation between clades in the Sierra Nevada and separation of the

Sierra Nevada clades from the North Coast clade were not as physically apparent and were informed by continuous sampling efforts in neighboring watersheds between clades. Where continuous landscape-level sampling was unavailable, the clade boundaries were estimated or inferred. Information is currently lacking for the precise boundary separating the North Coast clade and the North Feather clade, and the Central Coast clade from the South Coast clade. Therefore, we relied upon the genetic information for assessment of discreteness in this DPS analysis.

Meeting the first condition for discreteness, there are six statistically-supported discrete genetic entities (Central Coast, South Coast, South Sierra, North Sierra, North Feather, and North Coast) within the range of the foothill yellow-legged frog (see figure below). Two rangewide assessments of foothill yellow-legged frog genomic datasets revealed that this taxon is extremely differentiated by biogeographical boundaries (McCartney-Melstead *et al*. 2018, p. 112; Peek 2018, p. 76). All six entities, or clades, are markedly separate from each other, as evidenced by quantitative measures of genetic discontinuity, and at least five of the clades are monophyletic groups (McCartney-Melstead *et al*. 2018, p. 116). As a result, we have determined that the foothill yellow-legged frog is comprised of six discrete entities (North Coast, Central Coast, South Coast, North Feather, North Sierra, and South Sierra) meeting the condition of discreteness under our DPS policy.

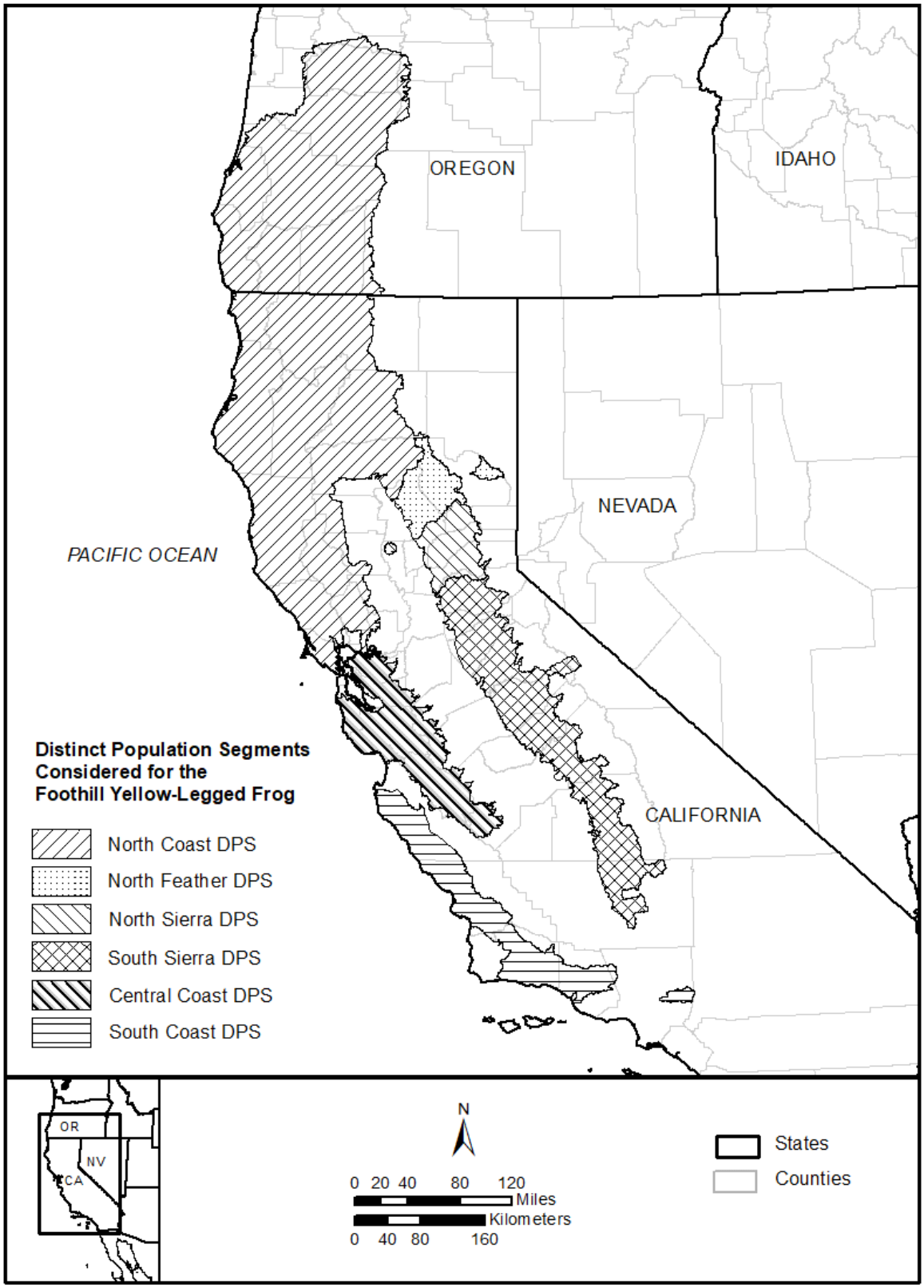


Figure of the Distinct Population Segments Considered for the Foothill Yellow-Legged Frog

Significance

Under our DPS Policy, once we have determined that a population segment is discrete, we consider its biological and ecological significance to the larger taxon to

which it belongs. This consideration may include, but is not limited to: (1) Evidence of the persistence of the discrete population segment in an ecological setting that is unusual or unique for the taxon, (2) evidence that loss of the population segment would result in a significant gap in the range of the taxon, (3) evidence that the population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historical range, or (4) evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

We evaluated each discrete population segment to see if it met the conditions of significance under our DPS policy, and we have determined that the six entities are significant to the foothill yellow-legged frog.

The support for significance of the six DPSs is based, in part, upon evidence that loss of any of these population segments would result in a significant gap in the range of the taxon. The loss of either the Central Coast or South Coast DPS would result in a substantial change in the overall range and distribution of the taxon. The loss of the South Coast DPS would shift the taxon's southwestern range boundary northward by approximately 150–200 kilometers (km) (93–125 miles (mi)). The loss of the Central Coast DPS would leave an extensive separation of approximately 300 km (186 mi) and be a significant gap in the species' range. The loss of the South Sierra DPS would result in a considerable contraction of the taxon's range, making the species' range shift approximately 180 km (112 mi) west and 340 km (211 mi) north. The loss of the North Coast DPS would result in the loss of more than half of the taxon's current range. The North Sierra and North Feather DPSs occupy much smaller areas than the other DPSs. However, based on the current range of each of these DPSs, the loss of either would result in a 50–75 km (31–47 mi) gap in the range of the taxon. Due to the species' limited

dispersal ability from occupied stream habitats, this gap would effectively prevent any potential future gene flow between the DPSs remaining on either side of the gap.

The support for significance of the six DPSs is also based upon evidence that each discrete population segment differs markedly from all the others in its genetic characteristics. The loss of any of the six DPSs would result in the loss of a discrete genetic clade. The DPSs that are most genetically divergent, and thus contribute most to the overall adaptive capacity of this taxon, are the Central Coast, South Coast, and South Sierra DPSs (Peek 2018, p. 77). The North Feather and North Sierra DPSs likely have unique adaptive potential in the face of climate change because of their admixture history (interbreeding of isolated populations) and intermediacy to the South Sierra and North Coast DPSs. The North Coast DPS is also genetically valuable to the taxon because it contains the greatest genetic diversity and is the only DPS that shows a trajectory of increasing genetic diversity (Peek 2018, p. 74).

Distinct Population Segment Conclusion

Our DPS Policy directs us to evaluate whether populations of a species are separate from each other to the degree they qualify as discrete segments and whether those segments are significant to the remainder of the species to which it belongs. Based on an analysis of the best available scientific and commercial data, we conclude that the North Coast, North Feather, North Sierra, South Sierra, Central Coast, and South Coast clades of the foothill yellow-legged frog's range are each discrete due to their marked genetic separation. Furthermore, we conclude that each of the six clades of the foothill yellow-legged frog's range is significant, based on evidence that a loss of any of the population segments would result in a significant gap in the range of the taxon and on evidence that the discrete population segments differ markedly from other populations of the species in their genetic characteristics. Therefore, we conclude that the six clades

within the foothill yellow-legged frog's range are both discrete and significant under our DPS Policy and are, therefore, uniquely listable entities under the Act.

Based on our DPS Policy (61 FR 4722; February 7, 1996), if a population segment of a vertebrate species is both discrete and significant relative to the taxon as a whole (i.e., it is a distinct population segment), its evaluation for endangered or threatened status will be based on the Act's definition of those terms and a review of the factors enumerated in section 4(a) of the Act. Having found that each of the six clades of the foothill yellow-legged frog's range meet the definition of a distinct population segment, we then evaluated the status of the six clades of the foothill yellow-legged frog to determine whether any met the definition of an endangered or threatened species under the Act. The figure below identifies the areas within the foothill yellow-legged frog's historical range encompassed by the six DPSs for the foothill yellow-legged frog.

Description of Foothill Yellow-Legged Frog Distinct Population Segments

Below is a general description of environmental and ecological conditions for each DPS.

North Coast DPS: The North Coast DPS includes the range of the foothill yellow-legged frog in northern California and central and southwestern Oregon. This DPS occupies parts of the Cascade Range, Klamath Mountains, central and southwest Oregon (including the Willamette Valley), northern California Coast Range north of San Francisco Bay, and a portion of the Sierra Nevada Mountains and foothills to the borders of Plumas and Butte Counties, California. This DPS covers the largest geographic area and has the greatest amount of genetic diversity of the species, suggesting that habitat conditions allow for populations within the DPS to be interconnected (McCartney-Melstad *et al.* 2018, p. 121; Peek 2018, p. 76). In Oregon, the area has the greatest precipitation and coolest temperatures within the species' range (PRISM Climate Group

2012, 30-year climate dataset, entire; Service 2021, table 3, p. 36). In California, the DPS is cooler and wetter on average than the DPSs to the south but is about equal to that of the North Sierra DPS (PRISM Climate Group 2012, 30-year climate dataset, entire; Service 2021, table 3, p. 36). The DPS also contains the most Level IV ecoregions (finest down-scaled ecosystems boundaries based on biotic and abiotic factors as defined by Omerick and Griffith 2014, entire), as well as several ecoregions that are not found anywhere else in the foothill yellow-legged frog's range, suggesting that the environmental conditions for habitat within this DPS are variable and not likely to be subject to rangewide environmental influences.

North Feather DPS: The North Feather DPS is located primarily in Plumas and Butte Counties, California. This DPS occupies the transition zone between the northern Sierra Nevada, Southern Cascades Foothills, and Tuscan Flows ecoregions. The DPS averages cooler and wetter conditions than the DPSs to the south (PRISM Climate Group 2012, 30-year climate dataset, entire; Service 2021, table 3, p. 36). The North Feather DPS differs from the surrounding watersheds outside the areas in terms of geology and aspect (Peek *et al.* 2019, p. 4638), and is the only known area where the foothill yellow-legged frog and the endangered Sierra Nevada yellow-legged frog (*Rana sierrae*) currently coexist (Peek *et al.* 2019, p. 4637).

North Sierra DPS: The North Sierra DPS is located primarily in Yuba, Sierra, Nevada, and Placer Counties, California. This DPS occupies the transition zone between the northern and central ecoregions of the Sierra Nevada Range. This transition zone is characterized by a southward decrease in annual precipitation, decrease in Douglas and white firs (*Pseudotsuga menziesii* and *Abies concolor*), increase in ponderosa pine (*Pinus ponderosa*), and geological shift from metamorphic rocks to volcanic and granitic rocks (Environmental Protection Agency Level IV Ecoregions, Griffith *et al.* (2016, entire)). Like the North Feather DPS, the North Sierra DPS receives notably more precipitation

than the South Sierra DPS; however, the mean annual temperature in the North Sierra DPS is more similar to that of the South Sierra DPS than that of the North Feather DPS (PRISM Climate Group 2012, 30-year climate dataset, entire; Service 2021, table 3, p. 36).

South Sierra DPS: The South Sierra DPS extends from the South Fork American River sub-basin to the transition zone between the Sierra Nevada and the Tehachapi Mountains that border the south end of the California Central Valley. This DPS largely includes ecoregions that are unique to the southern and central Sierra Nevada Range (Environmental Protection Agency Level IV Ecoregions, Griffith *et al.* (2016, entire)). The South Sierra DPS also shares an ecoregion transition zone with the North Sierra DPS. In terms of average precipitation and temperature, the South Sierra DPS is fairly dry and warm, but it falls intermediately among the northern DPSs and the DPSs south of San Francisco Bay (PRISM Climate Group 2012, 30-year climate dataset, entire; Service 2021, table 3, p. 36).

Central Coast DPS: The Central Coast DPS extends south from the San Francisco Bay through the Diablo Range and Coast Range (Santa Cruz Mountains and Gabilan Mountains) east of the Salinas Valley, California. On average, the Central Coast DPS receives the least amount of annual precipitation of all the DPSs (PRISM Climate Group 2012, 30-year climate dataset, entire; Service 2021, table 3, p. 36). The DPS contains several unique ecoregions associated with the Diablo and Coast Ranges. Although the mountain ranges of the Central Coast DPS are geologically unique and separated from those of the South Coast DPS by the Salinas Valley, there are several attributes such as overall elevation, elevation grade, and some vegetation types (Environmental Protection Agency Level IV Ecoregions, Griffith *et al.* (2016, entire)) which they share in common with the South Coast DPS mountain ranges. Climatic and habitat conditions of the DPS are drier than all other DPSs except for the South Coast DPS, which has conditions

similar to the Central Coast DPS, being warm and dry and containing waterways similar in size and hydrological properties (PRISM Climate Group 2012, 30-year climate dataset, entire; Service 2021, table 3, p. 36).

South Coast DPS: The South Coast DPS extends along the coastal Santa Lucia Range and the Sierra Madre Mountains in California. Ecoregions that are unique to the South Coast DPS include those associated with the Santa Lucia Range, Western Transverse Range, and Southern California Lower Montane Shrub and Woodland (Environmental Protection Agency Level IV Ecoregions, Griffith *et al.* (2016, entire)). As stated above, the streams and rivers in the South Coast DPS share similarities to many waterways in the Central Coast DPS. Waterways in the South Coast and Central Coast DPSs tend to have flashier flows, more ephemeral channels, and a higher degree of intermittency because of the region's more variable, and lower amount of, precipitation (Storer 1925, pp. 257–258; Gonsolin 2010, p. 54; Adams *et al.* 2017b, p. 10227). The South Coast and Central Coast DPSs receive the least amount of annual precipitation and average the warmest temperatures within the species' range (PRISM Climate Group 2012, 30-year climate dataset, entire; Service 2021, table 3, p. 36).

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an endangered species or a threatened species. The Act defines an endangered species as a species that is in danger of extinction throughout all or a significant portion of its range, and a threatened species as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether any species is an endangered species or a threatened species because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term "threat" to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term "threat" includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term "threat" may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an "endangered species" or a "threatened species." In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those

actions and conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an endangered species or a threatened species only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

The Act does not define the term "foreseeable future," which appears in the statutory definition of "threatened species." Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term "foreseeable future" extends only so far into the future as the Service can reasonably determine that both the future threats and the species' responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. "Reliable" does not mean "certain"; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species' likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors. For information regarding the foreseeable future for the foothill yellow-legged frog, see Current and Future Condition Analysis, below.

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an

assessment of the potential threats to the species. The SSA report does not represent a decision by the Service on whether the species should be proposed for listing as an endangered or threatened species under the Act. However, it does provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies. The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket FWS–R8–ES–2021–0108 on *http://www.regulations.gov* and from the Sacramento Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Our review of the foothill yellow-legged frog has determined that it is made up of six DPSs; therefore, we assessed the biological viability and regulatory status of each DPS separately. Because the North Coast DPS of the foothill yellow-legged frog occurs in Oregon and California, we split the North Coast DPS into a California and an Oregon analysis unit due to varying levels of information and to better understand if any management actions or habitat conditions may differ between the two areas (Service 2021, Chapter 3, pp. 35–36). We later combine the two analysis units to determine the status of the North Coast DPS as a whole. When we discuss general biological or other information regarding the species as a whole we use the term species. When we discuss information pertaining to one of the six DPSs we use the term DPS.

To assess the biological viability of each DPS of the foothill yellow-legged frog, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency supports the ability of the DPS to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years), redundancy supports the ability of the DPS to withstand catastrophic events (for example, droughts, large pollution events), and representation supports the ability of the DPS to adapt over time to long-term changes in

the environment (for example, climate changes). In general, the more resilient and redundant a DPS is and the more representation it has, the more likely it is to sustain populations over time, even under changing environmental conditions.

Using these principles, we identified each DPS's ecological requirements for survival and reproduction at the individual, population, and DPS levels, and described the beneficial and risk factors influencing the DPS's viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated the individual species' life-history needs. The next stage involved an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involved making predictions about the species' responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we used the best available information to characterize viability as the ability of a species to sustain populations in the wild over time. We use this information to inform our regulatory decision. In our development of the SSA and analysis of information, we divided our analysis into separate analysis units due to the varying degree of information throughout the species' range and other factors. The analysis units coincide with those areas we are considering as DPSs for the species except for the North Coast DPS which has been split into two analysis units. In California, the analysis units match those considered in the CDFW's evaluation for their status review and listing under the California Endangered Species Act.

Summary of Biological Status and Threats

In this discussion, we review the biological condition of each DPS and its resources, and the threats that influence each DPS's current and future condition, in order to assess each DPS's overall viability and the risks to that viability.

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have not only analyzed individual effects on each DPS, but we have also analyzed their potential cumulative effects. We incorporate the cumulative effects into our SSA analysis when we characterize the current and future condition of each DPS. To assess the current and future condition of each DPS, we undertake an iterative analysis that encompasses and incorporates the threats individually and then accumulates and evaluates the effects of all the factors that may be influencing each DPS, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire DPS, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative effects analysis.

Species Needs

Stream Habitat

The foothill yellow-legged frog is a stream-obligate species and is primarily observed in or along the edges of streams (Zweifel 1955, p. 221; Kupferberg 1996a, p. 1339). Most foothill yellow-legged frogs breed along mainstem water channels and overwinter along smaller tributaries of the mainstem channel (Kupferberg 1996a, p. 1339; GANDA 2008, p. 20). Habitat within the stream includes rocky substrate mostly free of sediments with interstitial spaces to allow for predator avoidance. Stream morphology is a strong predictor of breeding habitat because it creates the microhabitat conditions required for successful oviposition (i.e., egg-laying), hatching, growth, and metamorphosis. Foothill yellow-legged frogs that overwinter along tributaries often congregate at the same breeding locations along the mainstem each year (Kupferberg 1996a, p. 1334; Wheeler and Welsh 2008, p. 128). During the nonbreeding season, the smaller tributaries, some of which may only flow during the wet winter season, provide refuge while the larger breeding channels may experience overbank flooding and high

flows (Kupferberg 1996a, p. 1339). Habitat elements that provide both refuge from winter peak flows and adequate moisture for foothill yellow-legged frogs include pools, springs, seeps, submerged root wads, undercut banks, and large boulders or debris at high-water lines (van Wagner 1996, pp. 74–75, 111; Rombough 2006b, p. 159).

The streams occupied by foothill yellow-legged frogs occur in a wide variety of vegetation types including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, mixed chaparral, and wet meadow (Hayes *et al.* 2016, p. 5). The extensive range of habitat types used by the foothill yellow-legged frog demonstrates the species' non-specificity in regard to vegetation type and macroclimate of the species' terrestrial habitat component. While habitat conditions can be vastly different among these stream sizes, and across the species' geographic range, only a narrow range of abiotic conditions are tolerated by early life stages (i.e., eggs, tadpoles, and metamorphs) (Kupferberg 1996a, p. 1336; Bondi *et al.* 2013, p. 101; Lind *et al.* 2016, p. 263; Catenazzi and Kupferberg 2018, pp. 1044–1045). The abiotic conditions that directly influence the success of early life stages are those associated with stream velocity, water depth, water temperature, and streambed substrate. Foothill yellow-legged frogs also require stream flow regimes to have or mimic natural flow patterns which includes high winter flows with a slowly diminishing hydrograph with increasing water temperature and decreasing flows into the spring and summer. Higher winter flows can maintain and or increase breeding habitat by widening and diversifying channel morphology, improving rocky substrate conditions, and increasing sunlight (Lind *et al.* 1996, pp. 64–65; Lind *et al.* 2016, p. 269; Power *et al.* 2016, p. 719). The reduction in flows and increasing water temperatures are also cues to initiate breeding. As a result, foothill yellow-legged frogs rely on natural, predictable changes during the hydrological cycle to optimize early life-stage growth and survival (Kupferberg 1996a, p. 1332; Bondi *et al*. 2013, p. 100).

Food Resources

During their lifecycle foothill yellow-legged frogs feed on a variety of plant and animals. During early development food sources include algae, diatoms, and detritus that are scraped from submerged rocks and vegetation (Ashton *et al*. 1997, p. 7; Fellers 2005, p. 535). Juvenile and adult foothill yellow-legged frogs prey upon many types of aquatic and terrestrial invertebrates including snails, moths, flies, water striders, beetles, grasshoppers, hornets, and ants (Nussbaum *et al.* 1983, p. 165).

Migration/Dispersal Routes and Connectivity

Adult foothill yellow-legged frogs primarily use waterway corridors to migrate or disperse (Bourque 2008, p. 70) and make their movements over multiple days (GANDA 2008, p. 22). While most foothill yellow-legged frogs are found in, or very close to, water, juveniles and an adult have also been observed moving through upland areas outside of riparian corridors. The habitat characteristics needed by foothill yellow-legged frogs for migration and dispersal are largely the same as they are for upland and tributary habitat. However, movement routes do not need to be moist for extended periods. Routes need to connect breeding areas and overwintering habitat without exposing frogs to large physical barriers (e.g., roads, development, reservoirs) or high risk of predation. These migration and dispersal routes provide for metapopulation connectivity and allows for ease of mobility (for post-metamorphic frogs) within a metapopulation and between different metapopulations. Both breeding/rearing and overwintering sites need to be distributed across the metapopulation area. Foothill yellow-legged frog occupancy (i.e., presence of breeding adults in a given area) must also be well distributed, such that dispersers are able to repopulate extirpated areas of the metapopulation. A resilient foothill yellow-legged frog metapopulation should have a network of quality breeding/rearing sites (often on or near the mainstem channel) and overwintering sites (often on tributaries of the mainstem) that are connected by habitat suitable for migration

and dispersal (Section 4.9 Migration and Dispersal Routes). An in-depth discussion of habitat and population elements required for the foothill yellow-legged frog is in the SSA report (Service 2021, Chapter 4 and Chapter 5).

Threats Influencing Current and Future Condition

Following are summary evaluations of the threats analyzed in the SSA report for the foothill yellow-legged frog. The discussion focuses on general threats impacting all DPSs, with some anecdotal evidence regarding threats operating in particular DPSs. The specific threats associated with each DPS are identified in the status discussion for each DPS below and in the SSA report (Service 2021, Chapter 7, pp. 73–122).

Those threats having the greatest impacts on the species or its habitat include: Altered stream hydrology and flow regimes (Factor A) associated with dams, surface water diversions, and channel modifications and their impact on the species and its habitat; predation and resource competition from nonnative species (Factor C and Factor E, respectively), such as American bullfrogs (*Lithobates catesbeianus*), smallmouth bass (*Micropterus dolomieu*), and crayfish species (*Pacifastacus* spp.); disease (Factor C); habitat degradation, loss, and fragmentation associated with wildfire (Factor A); the effects of climate change, including increased temperatures, drying and drought, and extreme flood events (Factor E); habitat modification and altered hydrology as a result of conservation efforts for salmonid species (colder water temperatures, timing and intensity of water flows) (Factor E); habitat loss, degradation, and fragmentation (Factor A), and direct negative effects to individuals (Factor E) from other anthropogenic activities such as agriculture, mining, urbanization, roads, and recreation. Within our threat discussion, we also evaluate existing regulatory mechanisms (Factor D) and ongoing conservation measures that may ameliorate threat impacts on the species.

Livestock grazing and timber harvest were discussed as potential threats and potential beneficial influences in the recent status assessment for the foothill yellow-legged frog in California (CDFW 2019b, pp. 64–65, 67). These activities were also considered in the conservation assessment developed by the Forest Service and BLM as part of their sensitive species program for the species in Oregon (Olson and Davis 2009, pp. 18–20). While there is potential for harm to the species (e.g., when grazing and timber practices cause excessive erosion and sedimentation into streams), there are also potential positive benefits to foothill yellow-legged frog habitat from these practices (Olson and Davis 2009, pp. 18–20; CDFW 2019b, pp. 64–65, 67). We captured and evaluated the potential negative impacts associated with grazing and timber harvest (e.g., water impoundments for cattle, erosion, logging roads) in our assessment of altered hydrology, sedimentation, and roads. For full descriptions of all threats and how they impact the species, please see the SSA report (Service 2021, pp. 72–121).

Altered Stream Hydrology and Flow Regimes

Foothill yellow-legged frog ecology and habitat needs are closely tied to the natural hydrological cycle of the streams they inhabit. Foothill yellow-legged frog breeding and recruitment are dependent upon specific stream morphologies and upon predictable hydrological patterns that are synchronized with other climatic cues for foothill yellow-frog populations to be successful (Kupferberg 1996a, p. 1337). Strong stream flow events typical during winter under natural flow regimes help maintain and create foothill yellow-legged frog breeding habitat by widening and diversifying channel morphology, improving rocky substrate conditions, removing sediment, and increasing sunlight by limiting vegetation encroachment (Lind *et al.* 1996, pp. 64–65; Lind *et al.* 2016, p. 269; Power *et al.* 2016, p. 719; GANDA 2018, pp. 37–38). Dams, water management, and other waterway modifications alter the hydrology, timing, temperature, and morphology of foothill yellow-legged frog stream habitat (Service 2021, pp. 74–79).

Alterations to flow regimes also occur for hydropeaking (for energy production) and recreational activities, such as spring and summer releases for whitewater boating (Kupferberg *et al.* 2012, p. 518) (see "Recreation," below). These pulse flows are generally much greater in frequency and intensity as compared to other flow fluctuations and, during spring and summer, can detrimentally affect early life stages of foothill yellow-legged frog during breeding and rearing season (Greimel *et al*. 2018, p. 92, Kupferburg *et al.* 2009c, Kupferburg *et al*., 2011b, p.144). Therefore, alterations of stream hydrology and flows can have a large influence on foothill yellow-legged frog distribution and metapopulation dynamics (Hayes *et al.* 2016, pp. 24–25; Service 2021, figure 21, p. 25).

The effects of altered streams also impede foothill yellow-legged frog dispersal and metapopulation connectivity, which can prevent recolonization of extirpated areas and cause genetic bottlenecks (Peek 2010, p. 44; Peek 2012, p. 15). Genetic comparisons among subpopulations demonstrated that gene flow is decreased in regulated river systems, even when the amount of regulation is low (Peek 2012, p. 15; Peek *et al*. 2021, p. 14).

Many population declines across the foothill yellow-legged frog's range have been attributed to the altered flow regimes and habitat fragmentation associated with water storage and hydropower dams (Kupferberg *et al.* 2009c, p. ix). Where populations of foothill yellow-legged frogs persist in these areas, breeding population densities were more than five times smaller below dams than in free-flowing rivers (based on breeding populations in the North Coast DPS, North Feather DPS, and Central Coast DPS) (Kupferberg *et al.* 2012, p. 520). Dams and impoundments, as well as historical use of splash dams (temporary wooden dams created to facilitate transport of logs downstream) in the North Coast DPS in Oregon, have also presumably caused extirpations of the

species and altered stream characteristics in some locations (Miller 2010, pp. 14, 61–63, 70–71, table 2.9; Linnell and Davis 2021, not paginated, figures 6 and 7).

Altered flow regimes and water diversions (as well as several anthropogenic activities, such as mining, agriculture, overgrazing, timber harvest, and poorly constructed roads), as described in greater detail below, can cause or increase sedimentation in breeding habitat for the foothill yellow-legged frog (Moyle and Randall 1998, pp. 1324–1325). Increased sedimentation can increase turbidity, impact algae and other food resources or impede foothill yellow-legged frog egg mass attachment to substrate (Cordone and Kelley 1961, pp. 191–192; Ashton *et al*. 1997, p. 13). Fine sediments can also fill interstitial spaces between rocks, which provide shelter from high velocity flows, cover from predators, and sources of aquatic invertebrate prey (Harvey and Lisle 1998, pp. 12–14; Olson and Davis 2009, p. 11; Kupferberg *et al*. 2011b, pp. 147–149).

Predation

Foothill yellow-legged frogs can be negatively affected by several native and nonnative animal species. The American bullfrog, native and nonnative fish, and nonnative crayfish have all been linked to impacting populations of foothill yellow-legged frogs (Olson and Davis 2009, pp. 17–18; Hayes *et al.* 2016, pp. 49–51). The following discussion provides details on how these predatory species affect the foothill yellow-legged frog at various life stages through predation and competition.

American bullfrogs: American bullfrogs are considered a threat to all six DPSs. Bullfrogs affect foothill yellow-legged frog populations in several ways because they are simultaneously competitors, predators, and disease vectors, and they impact life stages from tadpoles to adults (see figure 23 in the SSA report, Service 2021, p. 80). Bullfrogs impact foothill yellow-legged frogs by direct predation (Crayon 1998, p. 232; Hothem *et al*. 2009, pp. 279–280) and indirectly by reducing survival. In one experiment, the

presence of bullfrog tadpoles reduced foothill yellow-legged frog tadpole survival by 48 percent and mass at metamorphosis by 24 percent (Kupferberg 1997a, p. 1736). Additionally, the algal and macroinvertebrate assemblages available to foothill yellow-legged frogs were significantly reduced due to the presence of bullfrog tadpoles (Kupferberg 1996b, p. 2; Kupferberg 1997a, p. 1736), which would negatively affect food sources for foothill yellow-legged frog tadpoles, juveniles, and adults. The spread of bullfrogs is facilitated by altered hydrology, land-use change, drought, and increasing water temperatures (Moyle 1973, p. 21; Fuller *et al.* 2011, pp. 210–211; Adams *et al.* 2017a, p. 13). Regulatory mechanisms to manage importation and distribution of bullfrogs are currently ineffective due to an inability to adequately enforce regulations (CDFW 2014, pp. 11–12).

Fish: Fish such as smallmouth bass, green sunfish (*Lepomis cyanellus*), mosquitofish (*Gambusia affinis*), and trout (*Oncorhynchus*, *Salmo*, and *Salvelinus* spp.) are predators of foothill yellow-legged frogs and may also potentially compete with them for invertebrate food resources (Hayes *et al*. 2016, p. 51). However, of these fish, smallmouth bass are the greatest threat to foothill yellow-legged frogs. Adult smallmouth bass consume amphibian tadpoles (Kiesecker and Blaustein 1998, pp. 776–787), as well as foothill yellow-legged frog tadpoles and adults (Rombough 2006a, unpaginated; Paoletti *et al*. 2011, p. 166). Smallmouth bass have been identified as a potential cause of foothill yellow-legged frog declines and extirpations in Oregon (Rombough 2006a, unpaginated; Olson and Davis 2009, pp. 13, 17).

The distribution of smallmouth bass in California includes the entire South Coast DPS and lower elevation areas of the South Sierra, North Sierra, and North Feather DPSs. Areas in the foothill yellow-legged frog's range in the Salinas, Santa Clara, Central, and Sacramento Valleys are also within the range of the smallmouth bass. For the North Coast DPS, smallmouth bass occupy the Russian River, Trinity, and Eel River

drainages (Conservation Biology Institute 2011, entire). In Oregon, smallmouth bass can be found in the entire range of the North Coast DPS except the extreme southeastern portion near the Klamath basin (Carey *et al*. 2011, p. 306).

Nonnative crayfish: Several nonnative crayfish species prey upon early life stages of foothill yellow-legged frog. While the signal crayfish (*Pacifastacus leniusculus*) is native to part of the North Coast DPS (i.e., Oregon and northwestern corner of California), it has been introduced into several areas within the coast ranges of northern California and the Sierra Nevada (Wiseman *et al.* 2005, p. 162; Pintor *et al.* 2009, p. 582; CDFW 2019b, p. 56). In both the native and introduced range of the signal crayfish, the species preys upon foothill yellow-legged frog egg masses, and likely contributes to dislodging egg masses from substrate, potentially allowing them to be transported to unsuitable habitat (Rombough and Hayes 2005, p. 163; Wiseman *et al.* 2005, p. 162). Signal crayfish are prey upon foothill yellow-legged frog tadpoles in laboratory settings (Kerby and Sih 2015, p. 266), and observations of tail injuries in wild tadpoles suggest crayfish predation also occurs in the wild (Rombough and Hayes 2005, p. 163; Wiseman *et al.* 2005, p. 162).

Disease

Foothill yellow-legged frogs can be negatively affected by amphibian chytrid fungus (*Batrachochytrium dendrobatidis* (Bd)), parasitic copepods, and *Saprolegnia* fungus (see figure 24 in the SSA report, Service 2021, p. 83).

Bd is implicated in the declines or presumed extinctions of hundreds of amphibian species (Scheele *et al.* 2019, p. 1). The spread of Bd in the range of the foothill yellow-legged frog is presumably linked to increased human use of habitat and the introduction of nonnative bullfrogs, which are Bd reservoir hosts (Huss *et al*. 2013, p. 341; Adams *et al*. 2017b, pp. 10225–10226; Yap *et al*. 2018, pp. 1–2; Byrne *et al*. 2019, p. 20386). The southern California precipitation regime (i.e., alternation of extreme droughts and floods)

may increase the likelihood of disease outbreaks by causing favorable habitat conditions for bullfrogs, warmer water temperatures, and increased stress on foothill yellow-legged frogs (Adams *et al*. 2017b, p. 10228). Bullfrog presence is a positive predictor of Bd prevalence and load in foothill yellow-legged frogs (Adams *et al*. 2017a, p, 1). The Bd pathogen has been documented within all DPSs (Yap *et al*. 2018, p. 5, figure 1), and evidence of Bd prevalence suggests that Bd played a role in the precipitous decline of the foothill yellow-legged frog in southern California. Bd has been implicated in the decline of the foothill yellow-legged frog in both the Central Coast DPS and South Coast DPS (Adams *et al*. 2017b, p. 10224). Bd may also have sublethal effects on foothill yellow-legged frogs. Foothill yellow-legged frogs that tested positive for Bd had lower body mass to length ratios, although the frogs showed no other signs of infection (Lowe 2009, pp. 180–181). Tadpole susceptibility experiments with other western anurans documented species-specific effects of Bd exposure such as tadpole lethargy (motionless at bottom of tank), disorientation, weak response to prodding, and increased incidence of tadpole mouthpart deformities (Blaustein *et al.* 2005, pp. 1464–1466).

Parasitism of foothill yellow-legged frogs by the Eurasian copepod, *Lernaea cyprinacea*, is linked to malformations in tadpole and juvenile foothill yellow-legged frogs (Kupferberg *et al.* 2009a, p. 529). In addition to malformations, this parasite likely has other sublethal effects on foothill yellow-legged frogs, such as stunted growth (Kupferberg *et al.* 2009a, p. 529). Although direct foothill yellow-legged frog mortality from this parasite has not been documented in the wild, copepod parasitism may be responsible for mortality of tadpoles in captivity (Kupferberg 2019, entire; Oakland Zoo 2019, p. 1; Rousser 2019, entire). The changes predicted by climate change models (i.e., increased summer water temperatures and decreased daily discharge) may promote outbreaks of this parasite throughout the foothill yellow-legged frog's range (Kupferberg *et al.* 2009a, p. 529).

The water fungus (*Saprolegnia* sp.) causes egg mortality in amphibians of the Pacific Northwest (Blaustein *et al.* 1994, p. 251). Fungal infections of foothill yellow-legged frog egg masses, potentially from *Saprolegnia* but not confirmed, have been observed in the mainstem Trinity River (North Coast DPS) (Ashton *et al.* 1997, pp. 13–14), in approximately 25 percent of egg masses during a study in the South Fork Eel River (North Coast DPS) (Kupferberg 1996a, p. 1337), and in 14 percent of egg masses during 2002 and nearly 50 percent of egg masses during 2003 in the Cresta reach of the North Fork Feather River (North Feather DPS) (GANDA 2004, p. 55). While fungal infections are not a major source of mortality for foothill yellow-legged frogs, this threat has had a strong effect in other amphibian populations (Blaustein *et al.* 1994, pp. 251–253).

Habitat Loss, Degradation, and Fragmentation

Habitat loss, degradation, and fragmentation occurs throughout the species' range and is attributed to numerous factors including agricultural activities, mining, urbanization, roads, recreation, and wildfire.

Agriculture/Pesticides: Agriculture is a source of threats to the foothill yellow-legged frog because of agriculture's role in habitat degradation, the contribution of pesticides and pollutants to the environment, and its role as a driver of other threats such as altered hydrology and spread of nonnative species (see figure 26 in the SSA report, Service 2021, p. 88). Agricultural land uses have been linked to declines in foothill yellow-legged frog populations due to the impacts described above (Davidson *et al.* 2002, p. 1597; Lind 2005, pp. 19, 51, 62, table 2.2; CDFW 2019, p. 58). Foothill yellow-legged frog presence is negatively associated with agriculture within 5 km (3.1 mi) (Olson and Davis 2009, pp. 15, 22; Linnell and Davis 2021, not paginated, figures 6 and 7).

The proximity of foothill yellow-legged frog habitat downwind of the San Joaquin Valley (greatest use of airborne pesticides) suggests that foothill yellow-legged

frog declines in the South Sierra unit may be linked to agricultural pesticide use (Davidson *et al.* 2002, p. 1594; Davidson 2004, pp. 1900–1901; Bradford *et al.* 2011, p. 690). Water samples from low elevations in the Sierra Nevada have had concentrations of pesticides that were within the lethal range for foothill yellow-legged frogs (Bradford *et al.* 2011, p. 690). Foothill yellow-legged frog tadpoles are especially vulnerable to pesticides, especially if pesticide exposure occurs in the presence of other threats, such as competition or predation (Davidson *et al.* 2007, entire; Sparling and Fellers 2007, entire; Sparling and Fellers 2009, entire; Kerby and Sih 2015, entire). Impacts from pesticides include reduced body size, slower development rate, and increased time to metamorphosis as well as decreased development of natural anti-microbial skin peptides (presumably a defense against the disease, chytridiomycosis) (Davidson *et al*. 2007, p. 1774; Sparling and Fellers 2009, pp. 1698, 1701; Kerby and Sih 2015, pp. 255, 260).

Trespass Cannabis Cultivation: Trespass cannabis cultivation (illegally establishing largescale cannabis farms) occurs throughout the species' range, but the North Coast (California), Central Coast, and South Coast DPSs may be most at risk from this threat (CDFW 2019b, pp. 61–62). These unregulated activities impact the foothill yellow-legged frog by destroying or degrading habitat, increasing water diversion, increasing sedimentation, and introducing pesticides and other chemicals that reduce water quality and impact the species (Bauer *et al*. 2015, entire).

Mining Activities: Mining activities, including aggregate, hard-rock, and suction-dredge mining, are sources of threats to the foothill yellow-legged frog habitat because of their role in habitat destruction and degradation, pollution, and expansion of nonnative species (Hayes *et al.* 2016, pp. 52–54; Service 2021, figure 29, p. 94). Hydraulic mining, although outlawed, has had and continues to have long-lasting legacy effects and is still affecting aquatic ecosystems in California, with the North Feather DPS and North Sierra DPS being the most impacted (Hayes *et al.* 2016, pp. 52–54; CDFW 2019b, pp. 57–58).

The immediate and legacy effects and extent of mining practices are outlined in Table 8 of the SSA report (Service 2021, table 8, pp. 92–93), and include habitat destruction and alteration, sedimentation, changes in stream morphology, decreased stream heterogeneity, creation of ponded habitat (that supports nonnative species), decreased water quality, and contamination. A moratorium of suction-dredging in streams has currently been put in place for California. However, the State is currently developing new guidance and permitting processes for potentially reinitiating suction-dredging activities (State Water Resources Control Board 2020, entire). Oregon has restricted suction-dredging in the foothill yellow-legged frog's range (National Genomics Center for Wildlife and Fish Conservation 2021, entire).

Urbanization: Urbanization (development and roads) can affect foothill yellow-legged frogs and their habitat through direct mortality and from habitat destruction, degradation, and fragmentation. Urbanization can also contribute to increased occurrence of pesticides and pollutants being introduced to the environment and increases in other threats such as altered hydrology, introduction and spread of nonnative species, and assist in disease transmission (see figure 30 in the SSA report, Service 2021, p. 95). Conversion or alteration of natural habitats for urban land uses has been linked to declines in foothill yellow-legged frog populations (Davidson *et al*. 2002, p. 1597; Lind 2005, pp. 19, 51, 62, table 2.2). Foothill yellow-legged frog presence is negatively associated with cities and road density (Davidson *et al*. 2002, p. 1594; Olson and Davis 2009, p. 22). Increases in urbanization and roads have been reportedly associated with foothill yellow-legged frog extirpations in the South Coast DPS, possibly by facilitating the spread of Bd and nonnative species (Adams *et al*. 2017b, p. 10227).

Recreational Activities: Some recreational activities can affect foothill yellow-legged frogs in a variety of ways, depending on the region and type of recreation. Impacts from recreation can be localized, such as trampling or dislodging of egg masses, while

others are greater in extent or contribute to other threats. These greater threats include off-highway vehicle use causing habitat degradation and increased sedimentation (Olson and Davis 2009, p. 23), nonnative sportfish stocking of smallmouth bass (see Predation) (ODFW 2009, pp. 8, 11; CDFW 2019a, entire), and altered hydrology due to whitewater boating (Borisenko and Hayes 1999, pp. 18, 28; Kupferberg *et al.* 2012, p. 518). Some dam operations include planned, short pulse flows during the spring and summer to specifically provide recreation opportunities for whitewater boaters (Kupferberg *et al.* 2012, p. 518). As with other impacts associated with water management, the timing of these strong unseasonal flows has coincided with the foothill yellow-legged frog breeding and rearing season, leading to negative population-level impacts in the North Feather DPS (Kupferberg *et al.* 2012, pp. 518, 520–521, figure 3b).

Wildfire: Wildfire is a natural phenomenon throughout the range of the foothill yellow-legged frog, and its occurrence and severity are positively influenced by urbanization, roads, recreation, and the effects of climate change. The effects on foothill yellow-legged frogs from wildfire and its suppression are not well understood and have not been directly studied (Hayes *et al.* 2016, p. 35, table 6; CDFW 2019b, p. 71). The impacts of wildfire are also a function of the severity and intensity of the wildfire, which can be extremely variable across the landscape depending on topography and vegetation. Anecdotally, foothill yellow-legged frog populations have survived low- to moderate-severity wildfires (Lind *et al.* 2003, p. 27; CDFW 2019b, p. 71), and it is suspected that low-severity fires do not have adverse effects on the foothill yellow-legged frog (Olson and Davis 2009, p. 24). In fact, wildfires may benefit habitat quality by decreasing canopy cover and increasing habitat heterogeneity (Pilliod *et al.* 2003, pp. 171, 173; Olson and Davis 2009, p. 24). Direct mortality from scorching is unlikely, given the species' aquatic nature and the sightings of foothill yellow-legged frogs immediately after wildfires (CDFW 2019b, p. 71). In contrast, high-severity wildfires can greatly alter

water and habitat quality, remove all vegetative canopy, and reduce habitat heterogeneity by burning vegetative and woody debris that foothill yellow-legged frogs use for shelter. Short- and long-term effects of severe wildfires include potentially harmful changes in water chemistry and increased erosion and sedimentation from flooding (CDFW 2019b, pp. 71–72), which can destroy or degrade breeding habitat and interstitial spaces. Furthermore, the use of fire retardants and suppressants during wildland firefighting can affect amphibians by harming water quality and by direct toxicity to amphibians and their food sources (Pilliod *et al.* 2003, pp. 174–175; Service 2018, pp. 42–44). See the SSA report for additional information regarding trends and impacts of wildfire (Service 2021, section 7.9, pp. 100–109)

Effects of Climate Change

The effects of climate change are already having statewide impacts in California and Oregon (Bedsworth *et al.* 2018, p. 13; Mote *et al.* 2019, p. ii, summary). Overall trends in climate conditions across the foothill yellow-legged frog's range include increasing temperatures, greater proportion of precipitation falling as rain instead of snow, earlier snowmelt (influencing streamflow), and increased frequency, duration, and severity of extreme events such as droughts, heat waves, wildfires, and floods (OCCRI 2019, pp. 5–7, tables 2 and 3; Public Policy Institute of California 2020, not paginated). A rangewide study of occupancy found that foothill yellow-legged frog presence is negatively related to the frequency of dry years and to precipitation variability, suggesting that the species may already be declining due to the effects from climate change (Lind 2005, p. 20).

Projected increases in temperature are likely to affect foothill yellow-legged frogs differently in different parts of the range. Warming temperatures are likely to have some positive effects in areas where stream temperatures are typically colder, allowing for greater foothill yellow-legged frog population growth rates and early life stage survival

(Kupferberg *et al.* 2011a, p. 72; Rose *et al.* 2020, p. 41). However, researchers observed an unexpected die-off (unknown cause) of late-stage tadpoles that coincided with maximum daily temperatures exceeding 25 degrees Celsius (°C) (77 degrees Fahrenheit (°F)) (Kupferberg *et al.* 2011a, pp. 14, 58; Catenazzi and Kupferberg 2018, pp. 43–44, figure 2). Temperatures greater than the preferred thermal range may also have lethal or sublethal effects on tadpoles and metamorphs from parasites (Kupferberg *et al.* 2009a, p. 529; Kupferberg *et al.* 2011a, p. 15). There may be additional negative consequences to rising stream temperatures, even where temperatures are currently cold. Increasing temperatures may facilitate colonization by nonnative species (Fuller *et al.* 2011, pp. 210–211; Kiernan *et al.* 2012, pp. 1480–1481). Bd prevalence in bullfrogs was also found to be greater when water temperature was warmer than 17 °C (63 °F) (Adams *et al.* 2017a, pp. 12–13).

In California, a 25 to100 percent increase in the frequency of extreme dry-to-wet precipitation events (such as that of the 2012–2016 drought followed by the extremely wet winter of 2016–2017) is projected during the 21st century (Swain *et al.* 2018, p. 427). This information indicates that the threats of drought and extreme flood events may increase by 25 to 100 percent in California. Increased frequency of extreme heat events, drought, and extreme precipitation and floods events are also projected to increase in Oregon (OCCRI 2019, pp. 5, 6, 13–14, tables 2 and 3). In order to assess future conditions, including future climatic conditions for the foothill yellow-legged frog, we developed a population viability analysis (PVA) (Rose *et al*. 2020, entire) that used climate and habitat change information consistent with current emission estimates such as those identified as Representative Concentration Pathway (RCP) 4.5 and RCP 8.5 (see Population Viability Analysis, below).

The projected changes in temperature, precipitation, and climate variability may exacerbate the effects of other threats on the foothill yellow-legged frog (Service 2021,

figure 46, p. 11). The potential interactions (between climate change effects and other threats) that can negatively affect the foothill yellow-legged frog include:

- An increased risk to human safety from flooding and increased risk of water shortages may necessitate more hydrological alterations (e.g., dams, surface-water diversions, changes to water releases, and channel modifications). While the effect of climate change is only projected to increase surface water stress by up to 5 percent in the Oregon portion of the North Coast DPS's range by mid-century, projected increases range from 5 to 30 percent in California watersheds (Averyt *et al.* 2013, p. 7, figure 7). In California, climate-induced surface water stress is projected to increase the most in the South Sierra DPS and the least in the North Coast DPS (Averyt *et al.* 2013, p. 7, figure 7).

- Increased frequency of drought, decreased spring/summer streamflow, and warmer water temperature may benefit nonnative predators and competitors such as bullfrogs and nonnative fish (Brown and Ford 2002, pp. 332, 338–340, figure 3; Fuller *et al.* 2011, pp. 210–211; Adams *et al.* 2017a, p. 13).

- Increased summer water temperatures and/or decreased daily stream discharge and other increases in climate variability are expected to increase copepod parasitism in foothill yellow-legged frogs (Kupferberg *et al.* 2009a, p. 529) or exacerbate the effects of disease outbreaks (Raffel *et al.* 2013, p. 147; Adams *et al.* 2017b, p. 10228).

- Observed and projected trends toward warmer and drier wildfire seasons in the western United States are likely to continue the trend toward higher-severity wildfires and larger burn areas (Parks and Abatzoglou 2020, pp. 1, 5–6). This would result in additional loss, degradation, fragmentation, and alteration of habitat, and secondary impacts from increased sedimentation and flooding for the foothill yellow-legged frog across its range.

Competing Conservation Interests

Many of the conservation activities that support native salmonid fishes (e.g., natural flow management, prevention of sedimentation) have positive influences on foothill yellow-legged frog habitat, connectivity, and juvenile and adult survival (Service 2021, section 7.12, figure 45, p. 113). However, some measures that are taken to improve habitat for cold-water salmonid fishes reduce habitat quality for the foothill yellow-legged frog by decreasing stream temperature and increasing tree canopy cover over streams. One of the management techniques used to support salmonid recruitment is to release high volumes of cold water from dams in the spring (to trigger spawning runs or to flush smolts out to the ocean) (Kupferberg 1996a, p. 1342; Kiernan *et al.* 2012, p. 1474). The timing of such flow events can negatively affect foothill yellow-legged frog breeding and recruitment (Kupferberg 1996a, pp. 1336–1337, 1342).

Current and Future Condition Analysis

In our analysis of the current and future condition, we assessed resiliency for each DPS of the foothill yellow-legged frog by evaluating the health and number of metapopulations for each DPS. A healthy metapopulation is defined in terms of its abundance, level of reproduction and recruitment, juvenile and adult survival, and connectivity between populations. To assess the current representation for the foothill yellow-legged frog, we considered the current diversity of ecological conditions and the genetic makeup of each DPS as a proxy for the DPS's adaptive capacity. Redundancy for the foothill yellow-legged frog was measured by the quantity and spatial distribution of resilient metapopulations across each DPS's range. Generally speaking, the greater the number of healthy metapopulations that are distributed (and connected) across the landscape, the greater the DPS's ability to withstand catastrophic events and, thus, the greater the DPS's overall viability.

Population Structure

Foothill yellow-legged frog distributions and movements across the species' range and within each DPS exhibit the characteristics of metapopulations (Lind 2005, p. 49; Kupferberg *et al.* 2009b, p. 132). A metapopulation consists of a network of spatially separated population units, or subpopulations, that interact at some level. Subpopulations are subject to periodic extirpation from demographic or environmental stochasticity, but then are naturally repopulated via colonization from nearby subpopulations. Numerous metapopulations may occur within a single stream reach or watershed depending on whether the subpopulations are interacting with each other. Each DPS is made up of numerous metapopulations. In our analysis for determining the range of each DPS, we considered this metapopulation structure when determining whether certain populations or segments interacted with each other and helped define boundaries for the DPSs, especially where some other natural or manmade barrier was not evident.

Historical Distribution

The historical distribution, as identified once the species was established as a single taxon of the foothill yellow-legged frog (Zweifel 1955, pp. 210, 273), extended from west of the crest of the Cascade Mountains in the Willamette River drainage to the coast in Oregon, south through the Coast Range to Los Angeles County, California, and down the Sierra Nevada foothills and mountains to 5,000 feet (1,524 meters) (CDFW 2019, pp. 7–8; Service 2021, p. 16, Figure 2). Isolated populations or individuals had been identified in the Sacramento (at Sutter Buttes) and Central Valleys (Mokelumne River drainage) of California and in Baja California Norte, Mexico (San Pedro Martir), but these locations were either isolated individuals or have not been found again (Loomis 1965, pp. 78–79; Stebbins 2003, pp. 231–233, 479). Based on our knowledge of foothill yellow-legged frog genetic divergence at much smaller spatial scales of isolation (McCartney-Melstad *et al.* 2018, p. 121; Peek 2018, p. 76), the distant Mexico population

once identified as foothill yellow-legged frog, now considered extirpated, most likely was a different taxon.

In Oregon, past impacts from timber operations resulting in stream alteration have reduced the historical range of the species in the Willamette Valley and in the southeast portion (portions of Jackson County) of the State (Olson and Davis 2009, p. 9–11). In California, the historical range has also been reduced most likely from hydrological alteration of habitat associated with water management (Lind 2005, pp. 65, 68, figures 2.1 and 2.4).

Current Distribution, Occupancy, Abundance, and Population Trends

The current distribution of the foothill yellow-legged frog generally follows the historical distribution of the species except with range contractions in the southern and, to a lesser extent, northern parts of the species' range as discussed above. Within areas currently occupied, foothill yellow-legged frog distribution is currently in a declining trend in several parts of the species' range with the species having disappeared from more than half of its historically-occupied locations (Lind 2005, pp. 38, 61, table 2.1). Some areas in Oregon, especially in the northern and northwestern portion of the species' range, have shown declines; however, recent survey efforts have identified additional populations of the species in some of these areas (National Genomics Center for Wildlife and Fish Conservation 2021, entire).

There has not been any rangewide occupancy or population abundance survey effort for the species, and some areas are more heavily surveyed than others. Because of this variation in the available data, we use presence in stream segments as an indicator of occupancy and spatial connectivity of populations. In our review of occupancy, distribution, and abundance, we used information from the California Natural Diversity Database (CNDDB 2020, foothill yellow-legged frog information) and other survey information obtained from Federal and other academic and private resource entities

throughout the species' range. The factors we analyzed to determine the condition of a population are (1) spatial and temporal trends in occupancy and reports of population abundance where available, (2) connectivity and isolation among occupied areas, (3) modeled risk of population decline that incorporates demographic and environmental information, and (4) status of threats and their effects. (see chapter 8 of the SSA report, Service 2021, pp. 122–166).

Foothill yellow-legged frog occupancy varies widely among the DPSs, with generally greater occupancy in the northern half of the range. The North Sierra DPS has the greatest proportion of presumed occupied stream segments (relative to the number of potential stream segments), followed by the North Coast (in California) and North Feather DPSs. Proportions of presumed occupied stream segments were much lower in the rest of the DPSs with the South Coast DPS having the lowest proportion of presumed occupied segments, followed by the South Sierra DPS (see table 10 in the SSA report, Service 2021, p. 125).

Based on historical and current occurrence data (Element Occurrences) for California (CDFW 2020, entire), 67–70 percent of all known occurrence locations are presumed to be occupied by the foothill yellow-legged frog in the North Coast DPS (in California), North Feather DPS, and North Sierra DPS (Service 2021, Table 10, p. 125). In contrast, less than 45 percent of known occurrence locations are presumed occupied in the South Sierra DPS, Central Coast DPS, and South Coast DPS (Service 2021, Table 10, p. 125). Based on patterns of current occupancy by decade of most recent detections (Service 2021, figures 47–53, pp. 127–139), occupied area appears to be declining in parts of each of the DPSs but less so in the northern California and southern Oregon portions of the taxon's range (North Coast DPS). There are large regions in both the northern part of the range (northern Oregon) (North Coast DPS in Oregon) and in the southern half of the species' range (South Sierra DPS, Central Coast DPS, and South

Coast DPS) that have not had any reported observations of foothill yellow-legged frogs for two or more decades. Foothill yellow-legged frogs are mostly extirpated in the South Coast DPS and currently occur only in two streams. Table 1 below identifies the percentage of occurrence records considered occupied (2000–2020) in California. Comparable Element Occurrence data are not available for the North Coast Oregon analysis unit. For our analysis of Oregon, we looked to other sources of information on occurrences (Service 2021, pp. 127–144).

Table 1: Percentage of Extant Occurrence Records (CDFW 2020) by Analysis Unit

Analysis Unit	2000–2020
North Coast, Oregon	Not Available
North Coast, California	67 percent
North Feather	70 percent
North Sierra	70 percent
South Sierra	43 percent
Central Coast	42 percent
South Coast	8 percent

Population Viability Analysis

In addition to our assessments of occupancy, abundance, and trends, using occurrence information, we worked with USGS researchers to complete a rangewide population viability analysis (PVA) for the foothill yellow-legged frog (Rose *et al*. 2020, entire). We used the information from the PVA to inform both the species' current condition (Service 2021, chapter 8, pp. 122–166) and potential future condition (Service 2021, chapter 9, pp. 167–193). The methods and information used for developing the models used in the PVA are described in section 8.4 of the SSA report (Service 2021, pp. 146–152). The results of the PVA focus on identifying patterns in risk attributed to areas having a greater than or equal to 50 percent decline within and between analysis units and characterize this as the 'risk of decline.'

The 'risk of decline' results from the PVA reflect many of the geographical patterns that we described above for occupancy data (Service 2021, section 8.2, pp. 123–

139). A summary of the PVA results for the current condition of foothill yellow-legged frog populations within the boundaries of the DPSs combined with our analysis of occupancy information is discussed below.

The North Sierra DPS has both the lowest average relative risk of decline and the greatest proportion of presumed occupied stream segments (relative to stream segments that have the potential to be occupied). The North Feather DPS has a medium-high average relative risk of decline and an intermediate proportion of occupied stream segments (relative to potential stream segments). Within the North Coast DPS, stream segments in northern California and southwestern Oregon have lower risks of decline, compared to streams near the San Francisco Bay area and the northern and eastern extents of the species' range in Oregon. The southern analysis units (Central Coast DPS, South Coast DPS, and South Sierra DPS) exhibit the strongest patterns of declining occupancy, with all stream segments within each DPS having either a medium or high relative risk of decline.

Chapter 9 of the SSA report (Service 2021, pp. 167–193) discusses the potential change in magnitude and extent of threats and the species' response to those threats into the future. We have determined that the effects of climate change and its impact on increasing temperatures, changes to precipitation and hydrology, and influence on wildfire and drought, as well as the continued regulated flows from managed streams, will drive threats on the species and affect its status into the future. The timeframe of our analysis for these threats is approximately 40 years. This period represents our best understanding of the projected future environmental conditions related to threats associated with climate change that would impact the species (increasing temperatures, greater proportion of precipitation falling as rain instead of snow, earlier snowmelt (influencing streamflow), and increased frequency, duration, and severity of extreme events such as droughts, heat waves, wildfires, and floods). The 40-year timeframe was

also used in our PVA as part of its analysis on determining risk for the species into the future (Rose *et al*. 2020, entire). Although we possess climate and habitat change projections that go out beyond 40 years, there is greater uncertainty between these model projections in the latter half of the 21st century and how the effects of the modeled changes will affect the species' response when projected past 40 years. Accordingly, we determined that the foreseeable future extends only 40 years for the purpose of this analysis and we rely upon projections out to approximately 2060 for predicting changes in the species' conditions. This timeframe allows us to be more confident in assessing the impact of climate and habitat changes on the species. Therefore, based on the available climate and modeling projections and information we have on the species, we have determined 2060 as the foreseeable future timeframe for the foothill yellow-legged frog.

Our assessment of future condition interprets the effects that the future changes to threats would potentially have on foothill yellow-legged frog resiliency, representation, and redundancy. In order to accomplish our review, three plausible future scenarios were considered and each DPS's future resiliency, redundancy, and representation under each scenario was assessed. As discussed above, we used information from a PVA (Rose *et al*. 2020, pp. 22–27) to assist us in determining the potential condition of foothill yellow-frog populations into the future. Although there are an infinite number of possible future scenarios, the chosen scenarios (i.e., lower change scenario, mean change scenario, and higher change scenario) reflect a range of reasonable scenarios based on the current understanding of climate change models, threats, and foothill yellow-legged frog ecology. The environmental conditions in each future scenario are plausible in that they are not meant to represent the lowest and highest projections of what is possible. Rather, the lower change and higher change scenarios are at the lower and upper ends of confidence intervals from climate change projections, land cover models, and stream temperature models (Rose *et al.* 2020, pp. 22–23). Environmental conditions for the three

future scenarios are based on published studies that used ensembles of global climate models (Isaak *et al.* 2017, p. 9188; Swain *et al.* 2018, p. 427; Sleeter *et al.* 2019, p. 3336). For the projections of spatially explicit covariates (i.e., land cover and stream temperature), downscaled regional climate model data were used (Isaak *et al.* 2017, p. 9186; Sleeter *et al.* 2019, p. 3339). The information from these studies reflects the best scientific and commercial information available for projections of land cover (Sleeter *et al.* 2019; Sleeter and Kreitler 2020, unpublished data), stream temperature (Isaak *et al.* 2017), and climate variability (Swain *et al.* 2018) within the range of the foothill yellow-legged frog.

Descriptions of each scenario and the anticipated effects of each scenario on resiliency, representation, and redundancy for each foothill yellow-legged frog DPS is in the SSA report (Service 2021, Table 17, sections 9.3–9.5, pp. 171, 174–193) and is summarized below.

Resiliency

Resiliency is having sufficiently robust populations for the species to withstand stochastic events (i.e., events arising from random factors). For the foothill yellow-legged frog, we determined that resiliency is a function of metapopulation health and the distribution and connectivity among metapopulations and subpopulations. To determine if foothill yellow-legged frog populations were resilient, we first assessed spatial and temporal trends in occupancy and abundance. We then assessed structural and functional connectivity among occupied areas. We also evaluated results from a study that modeled the risk of ≥50 percent decline in occupied stream segments using demographic and environmental information. Finally, we related our results to information from scientific literature, reports, and species experts. Table 2 below summarizes the current condition and future conditions of resiliency for each of the foothill yellow-legged frog DPSs. In the SSA report and the table below, we split the North Coast DPS into a California and an

Oregon analysis unit. These two analysis units are later combined for determination of the status of this DPS as a whole. The current condition column reflects the current resiliency of the analysis unit. The current resiliency of each DPS was characterized as having an intact, reduced, substantially reduced, or extensively reduced condition. Under each future scenario, we assessed how the following resiliency measures would change from current condition: (1) occupancy and abundance, (2) connectivity, (3) modeled risk of population decline, and (4) status of threats. Because changes to environmental conditions under the future scenarios were reflected by environmental covariates in the PVA (see Service 2021, section 9.2 (Scenarios); Table 17), we were able to forecast the magnitudes of changes in resiliency by comparing the modeled risk of decline (Rose *et al*. 2020, entire) under current conditions to modeled risk under the three future scenarios. The lower, mean, and higher change scenario columns represent any changes from each DPS's current resiliency. For this analysis, "functional extirpation" is defined as such extensive reduction in condition that extirpation of the entire unit is likely to eventually occur as remnant populations experience normal environmental and demographic fluctuations. For additional detail on current and future conditions of the DPSs, see the SSA report (Service 2021, chapters 8 and 9, pp. 122–193).

Table 2: Resiliency of the seven foothill yellow-legged frog analysis units.

Analysis Unit	**Current Condition**	**Lower Change Scenario**	**Mean Change Scenario**	**Higher Change Scenario**
North Coast DPS (Oregon)	Intact Resiliency	Slightly reduced from current	Slightly reduced from current	Markedly reduced from current
North Coast DPS (California)	Intact Resiliency	Slightly reduced from current	Markedly reduced from current	Greatly reduced from current. *Risk of functional extirpation*
North Feather DPS	Reduced Resiliency	No change	Markedly reduced from current. *Risk of functional extirpation*	Greatly reduced from current. *Risk of functional extirpation or extirpation*

Analysis Unit	Current Condition	Lower Change Scenario	Mean Change Scenario	Higher Change Scenario
North Sierra DPS	Intact Resiliency	Slightly reduced from current	Markedly reduced from current	Greatly reduced from current
South Sierra DPS	Substantially Reduced Resiliency	Slightly reduced from current	Markedly reduced from current. *Risk of functional extirpation or extirpation*	Greatly reduced from current. *Risk of functional extirpation or extirpation*
Central Coast DPS	Substantially Reduced Resiliency	Slightly reduced from current	Markedly reduced from current. *Risk of functional extirpation or extirpation*	Greatly reduced from current. *Risk of functional extirpation or extirpation*
South Coast DPS	Extensively Reduced Resiliency	Slightly reduced from current. *Risk of extirpation*	Markedly reduced from current. *Risk of extirpation*	Greatly reduced from current. *Risk of extirpation*

Representation

Representation describes the ability of a species to adapt to changing environmental conditions. This includes both near-term and long-term changes in its physical (e.g., climate conditions, habitat conditions, habitat structure, etc.) and biological (e.g., pathogens, competitors, predators, etc.) environments. This ability of a species to adapt to these changes is often referred to as "adaptive capacity." To assess the current condition of representation for the foothill yellow-legged frog, we considered the current diversity of ecological conditions and of genetic material throughout the range of the species.

There are considerable ranges of ecological conditions under which foothill yellow-legged frogs occur. As discussed in the SSA Report (Service 2021, Section 2.7 and CHAPTER 3), there are substantial differences in latitude, elevation, precipitation, average temperature, and vegetative community across the species' range. Parts of the foothill yellow-legged frog range also differ in terms of species composition and in hydrology (rain-fed versus snow-fed systems). Exemplary of these different ecological conditions, foothill yellow-legged frog tadpoles from snow-fed Sierra Nevada

populations have higher intrinsic growth rates than tadpoles from rain-fed coastal populations, likely due to their constraint to a shorter rearing season in the Sierra Nevada (Catenazzi and Kupferberg 2017, pp. 1255, 1260–1261).

As described in the SSA report (Service 2021, Section 2.6), two rangewide assessments of foothill yellow-legged frog genomic datasets revealed that this taxon is extremely differentiated following biogeographical boundaries (McCartney-Melstad *et al.* 2018, p. 112; Peek 2018, p. 76). The clades that are most genetically divergent (i.e., South Sierra, Central Coast, and South Coast clades), and thus could contribute most to the overall adaptive capacity of this taxon (McCartney-Melstad *et al.* 2018, p. 120; Peek 2018, p. 77), are also the clades with the lowest levels of population resiliency. The South Sierra and Central Coast clades have substantially reduced resiliency and the South Coast clade has extensively reduced resiliency (SSA Report (Service 2021, Section 8.5)). The reduced resiliency in these clades, means that the foothill yellow-legged frog is especially vulnerable to loss of this genetic diversity. The Central Coast and South Coast clades are the most genetically divergent, indicating that a significant amount of the taxon's overall genetic diversity would be lost if either clade were extirpated. The Central Coast and South Coast clades are also ecologically unique because they have lower annual precipitation and higher mean annual temperatures than elsewhere in the range of the species (PRISM Climate Group 2012, 30-year climate dataset; Table 3) and the region hosts the highest freshwater endemism of anywhere in the species' California range (Howard *et al.* 2013, p. 5).

While not as at risk of extirpation, the northern Sierra clades (i.e., North Feather and North Sierra clades) might also have unique adaptive potential in the face of climate change because of their admixture history and intermediacy to the South Sierra and North Coast clades (McCartney-Melstad *et al.* 2018, p. 121). The genetic clade that is comprised of the two North Coast units is also genetically valuable to the foothill yellow-

legged frog because it contains the greatest genetic diversity and is the only part of the range that shows a trajectory of increasing genetic diversity (McCartney-Melstad *et al.* 2018, pp. 120–121; Peek 2018, p. 74). The North Coast clade also potentially provides connectivity and a large latitudinal gradient for responding to the effects of climate change.

While the foothill yellow-legged frog clearly has a range of genetically divergent populations, it has likely already lost a lot of diversity due to large extirpations in the southern analysis units. The species is also at risk of further losses amidst trends toward decreasing occupancy and decreasing connectivity. The foothill yellow-legged frog is exhibiting an overall trend of decreasing genetic diversity in spite of the trend of increasing genetic diversity in the North Coast clade (McCartney-Melstad *et al.* 2018, pp. 120–121; Peek 2018, p. 74).

The trend of decreasing genetic diversity in the foothill yellow-legged frog may be leading to losses in adaptive capacity (i.e., ability to adapt to change). Loss of adaptive capacity lowers the species' viability because the decrease in ability to adapt to change increases extinction risk in the face of future changes. For foothill yellow-legged frog conservation, McCartney-Melstad *et al.* (2018, p. 122) strongly recommended that each of the major genetic groups be managed as independent recovery units. Peek (2018, p. 77) also recommended that conservation actions should prioritize protecting foothill yellow-legged frogs in the Central Coast, South Coast, and South Sierra clades because they are simultaneously the most distinct, divergent, and at-risk populations.

Redundancy

Redundancy describes the ability of a species to withstand catastrophic events. To assess redundancy for each analysis unit, we considered the (1) quantity of occupied stream segments (proxy for subpopulations) (SSA Report (Service 2021,Table 10)), (2) spatial distribution of occupied stream segments (SSA Report (Service 2021, Figure 55)),

and (3) population level factors such as connectivity, relative risk of decline, and level of threats. These factors were assessed in terms of their potential influence on the ability of foothill yellow-legged frog metapopulations to survive and recover after a plausible catastrophic event. For example, isolation of occupied stream segments or lack of functional connectivity in an analysis unit, could prevent recolonization of extirpated areas after a massive die-off or temporary habitat destruction.

At the analysis unit scale of redundancy, long-term viability after a catastrophic event would likely be possible in the North Coast clade (North Coast California and North Coast Oregon units) and might be possible in the North Sierra clade. In the North Coast clade, there are large numbers of occupied streams and there are numerous occupied stream segments that both are in the low risk of decline category and are distributed widely across the geographical area (SSA Report (Service 2021, Figure 55)). Furthermore, resiliency is intact in both of the two analysis units that comprise this clade. Resiliency is also intact in the North Sierra clade because there are numerous occupied stream segments that both are in the low risk of decline category and are distributed widely across the geographical area (SSA Report (Service 2021, Figure 55)). However, the North Sierra clade has less redundancy than the North Coast clade because the North Sierra clade is small in size and has poor functional connectivity, which could prevent recolonization after catastrophic events.

The North Feather DPS occupies a relatively small area and several streams or occurrences have been extirpated from past impacts (eastern portion of range, southwestern area near Lake Oroville, and some occurrences in northern Butte County) (CDFW 2020, dataset, entire; Service 2021, figure 49, p. 131). The North Feather DPS also has the highest average relative risk of population decline with only 16 (15 percent) of the 109 analyzed stream segments in the low risk category and 34 stream segments (31 percent) in the high risk category. Overall abundance of foothill yellow-legged frogs for

the North Feather DPS is largely unknown, but egg mass densities are very low in the two regulated stream reaches that have long-term monitoring (Rose *et al*. 2020, pp. 63–64, table 1). For example, sections of the Cresta reach of the North Feather River that historically had relatively high numbers of foothill yellow-legged frog egg masses did not have egg masses or were extremely reduced for several years (2006–2017) (CDFW 2019, p. 31; Dillingham 2019, p. 7). As a result, redundancy is limited in the North Feather DPS. The North Feather DPS is not only the smallest clade, but its occupied stream segments are not well-distributed over the geographical area (SSA Report (Service 2021, Figure 55)). The extant North Feather populations occupy an area small enough that a large catastrophic event, such as a high-severity wildfire or drought, could result in functional extirpation. Furthermore, the North Feather DPS has reduced resiliency because of poor occupancy and relatively high risk of population decline.

Redundancy is poor in the South Sierra and Central Coast clades. Both the South Sierra and Central Coast clades have substantially reduced resiliency because of poor occupancy, poor connectivity, relatively high risk of decline, and substantial threats. A single catastrophic event would be unlikely to extirpate the entirety of either unit, but the patchy distribution of occurrences (SSA Report (Service 2021, Figure 55)) and limited connectivity would make it extremely unlikely that extirpated areas would be recolonized naturally.

Redundancy within the South Coast clade is nearly zero. Not only is the resiliency in this clade extensively reduced, but there are only two known populations (SSA Report (Service 2021, Section 8.2)) in the South Coast clade. These two populations (comprised of seven stream segments) are also very close in proximity (SSA Report (Service 2021, Figure 55)). These streams are located close to one another, but the foothill yellow-legged frog populations within them appear to have lost genetic connectivity. Although the stream flows are not regulated by dams, the risk of population decline continues to be

medium or high under current conditions due to the combination of threats identified above altering habitat and impacting the DPS. Furthermore, the close proximity of the stream segments to each other makes the South Coast DPS especially vulnerable to extirpation from a single catastrophic event.

Overall Current and Future Condition

As discussed above, we used the information from the PVA to inform both the species' current condition (Service 2021, chapter 8, pp. 122–166) and potential future condition (Service 2021, chapter 9, pp. 167–193). The PVA assessed how the following measures would change from current condition: (1) occupancy and abundance, (2) connectivity, (3) modeled risk of population decline, and (4) status of threats under each future scenario. Because changes to environmental conditions under the future scenarios were reflected by environmental covariates in the PVA (see Service 2021, section 9.2 (Scenarios); Table 17), we were able to forecast the magnitudes of changes in resiliency by comparing the modeled risk of decline (Rose *et al*. 2020, entire) under current conditions to modeled risk under the three future scenarios. The results of the analysis showed that the average risk of population decline for each analysis unit increased under the three future scenarios (Rose *et al.* 2020, p. 39). Under current conditions and all future scenarios, the average relative risk of decline was highest in the South Sierra and Central Coast units and was lowest in the North Coast Oregon, North Coast California, and North Sierra units (Table 3 below and Service 2021, Tables 18 and 19). Under the lower change scenario, decreases in resiliency, compared to current conditions, were small in most analysis units. However, decreases in resiliency were more dramatic under the mean and higher change scenarios. These dramatic declines in resiliency put several analysis units at risk of unit-wide extirpation or functional extirpation (i.e., such extensive reduction in condition that extirpation of the entire unit is likely to eventually occur as remnant populations experience normal environmental and demographic

fluctuations) under the mean and higher change scenarios (SSA Report (Service 2021, Table 19)). One of the analysis units (South Coast unit) is at risk of unit-wide extirpation under all three of the future scenarios.

Table 3. Relative risk of decline summary for current condition and three future scenarios.

Analysis Unit	Risk of Decline			
	Current Condition	Lower Change Scenario	Mean Change Scenario	Higher Change Scenario
North Coast Oregon	Low	Medium	Medium	Medium
North Coast California	Medium	Medium	Medium	Medium
North Feather	Medium	Medium	High	High
North Sierra	Low	Low	Medium	Medium
South Sierra	Medium	High	High	High
Central Coast	Medium	Medium	High	High
South Coast	Medium	Medium	Medium	High

Conservation Efforts and Regulatory Mechanisms

Several initiatives and conservation efforts are in place and being implemented for foothill yellow-legged frog conservation including measures for rearing (headstarting), nonnative species removal, development of reintroduction feasibility studies, and habitat conservation planning for the species (Service 2021, table 9, pp. 117–120). Headstarting (hatching eggs and rearing into releasable frogs) has been started on the North Feather River. The program has just been started and the extent from headstarting is limited to a portion of the range of the North Feather DPS. Also benefitting the species (through regulatory protection) is the decision by the California Fish and Game Commission to list five foothill yellow-legged frog genetic clades

(referred to as analysis units in this document) under the California Endangered Species Act. In February 2020, the California Fish and Game Commission adopted the findings of the CDFW to list the South Coast, Central Coast, and South Sierra clades as endangered and list the North Feather and North Sierra clades as threatened under the California Endangered Species Act (Commission 2020, p. 1). Another regulatory benefit that applies to breeding and rearing habitat is the 2009 moratorium on suction-dredge mining in California. However, benefits to the foothill yellow-legged frog from the moratorium have not been studied, and permitting processes are in development so that the moratorium may be lifted (State Water Resources Control Board 2020, entire).

The foothill yellow-legged frog is listed as a sensitive species by the BLM and the Forest Service under their Sensitive Species program. These agencies define sensitive species as those species that require special management consideration to promote their conservation and reduce the likelihood and need for future listing under the Act. Any actions conducted by the Forest Service or BLM would need to take into consideration impacts to sensitive species and, if possible, implement best management practices to limit impacts to the species or its habitat. In addition, the species in northern portions of California and the species' range in Oregon on National Forest or BLM lands currently receive protection through conservation measures and best management practices under the Northwest Forest Plan's Survey and Manage program (USDA-USDOI 2001, entire). These measures reduce or eliminate impacts to habitat for the foothill yellow-legged frog and areas occupied by the species during road construction and maintenance activities as well as any vegetation management actions which assist in the reduction of threats associated with wildfire on BLM and Forest Service lands.

The Federal Energy Regulatory Commission (FERC) issues licenses for the operation of nonfederal hydropower projects. Within the range of the foothill yellow-legged frog, numerous hydropower projects require FERC licensing to operate. Part of

the licensing process includes consideration of recommendations for the protection of fish and wildlife. Some FERC license requirements have included measures to help protect and conserve foothill yellow-legged frogs including actions such as collection of data, implementation of modified flow regimes to mimic more natural conditions, and other standard best management practices.

Two joint Federal and State habitat conservation plans (HCPs) and California State natural community conservation plans (NCCPs) (Santa Clara Valley HCP/NCCP and East Contra Costa HCP/NCCP) have been approved and implemented for the foothill yellow-legged frog as a covered species and assist in local population and habitat conservation (Jones & Stokes 2006, entire; ICF International 2012, entire). Both HCP/NCCPs are in the northern portion of the Central Coast DPS's range. Another Federal HCP has been issued to the Humboldt Redwood (formerly Pacific Lumber) Company. The Humboldt Redwood Company (HRC) HCP covers areas within the range of the North Coast DPS in Humboldt County and includes adaptive management strategies designed to maintain viability in populations of foothill yellow-legged frogs and other covered aquatic herpetofauna (HRC 2015, entire).

Due to the limited nature of existing conservation efforts and no rangewide planning or coordination, the current conservation efforts are localized. In addition, several ongoing efforts are preliminary steps to on-the-ground conservation (e.g., feasibility research) and other efforts have not had enough time to verify long-term success (e.g., population headstarting) or determine if and how the condition of a foothill yellow-legged frog population may have improved (e.g., bullfrog removal) (Service 2021, section 7.15, pp. 116–121). Therefore, large scale conservation efforts are not known to be currently outweighing any of the threats described above at the species or DPS level, but may reduce some effects at the individual or smaller localized population level.

Determination of Status for the Foothill Yellow-Legged Frog

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of an "endangered species" or a "threatened species." The Act defines an "endangered species" as a species in danger of extinction throughout all or a significant portion of its range, and a threatened species as a species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether a species meets the definition of an "endangered species" or a "threatened species" because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

In determining potential future threats facing the six DPSs, we evaluated various future conditions based on projections of changes in threats. Our timeframe for review looked out approximately 40 years based on the effects of climate change and information developed for the PVA. This was our timeframe for our threats analysis of future conditions for the six DPS to determine if they were likely to become endangered within the foreseeable future (i.e., if they meet the Act's definition of "threatened species") throughout their ranges.

Status of the South Sierra DPS and the South Coast DPS of the Foothill Yellow-Legged Frog Throughout All of Their Ranges

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the South Sierra and South Coast DPSs of the foothill yellow-legged frog and their habitat. Below we summarize our assessment of status of the South Sierra DPS and South Coast DPS under the Act.

South Sierra DPS: Threats are numerous and severe for the South Sierra DPS and include altered hydrology (Factor A), agriculture (including airborne pesticide drift) (Factor A), illegal cannabis cultivation (Factor A), predation by nonnative species (Factor C), disease and parasites (Factor C), mining (Factor A), urbanization (including development and roads (Factor A), recreation (Factor E), severe wildfire (Factor A), drought (Factor E), extreme flooding (Factor E), the effects of climate change (e.g., increased temperatures, variability in precipitation events, increased drought frequency) (Factor E), and inadequacy of regulatory mechanisms (Factor D). After evaluating threats to the DPS and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we conclude that under current conditions, resiliency, redundancy and representation are substantially reduced due to existing range contractions and the DPS's extensive extirpations and patchy distribution within and between stream segments. Both structural and functional connectivity are also poor in the South Sierra DPS. While exact abundances are largely unknown, populations within the DPS are relatively small and isolated and are impacted by numerous threats that are of such extent and magnitude that they are making the South Sierra DPS currently more susceptible to loss from stochastic or catastrophic events. The South Sierra DPS also has a high average risk of decline with no stream segments in lower risk categories under current conditions. As a result, we find that the magnitude and imminence of threats facing the South Sierra DPS of the foothill yellow-legged frog place the DPS in danger of extinction now, and therefore a threatened status is not appropriate. Thus, after assessing the best scientific and commercial information available, we determine that the South Sierra DPS of the foothill yellow-legged frog is in danger of extinction throughout all of its range.

South Coast DPS: There are numerous, severe threats to the South Coast DPS of the foothill yellow-legged frog including altered hydrology (Factor A), drought (Factor E), nonnative species (Factor C), disease and parasites (Factor C), urbanization (including

development roads) (Factor A), and recreation (Factor E), illegal cannabis cultivation (Factor A), extreme floods (Factor E), severe wildfire (Factor A), the effects of climate change (e.g., increased temperatures, precipitation variability, increased drought frequency and duration) (Factor E), and inadequacy of regulatory mechanisms (Factor D). After evaluating threats to the DPS and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we conclude that under current conditions, resiliency, redundancy, and representation are poor for the South Coast DPS. Foothill yellow-legged frogs are mostly extirpated in this DPS and currently occur only in two streams. These streams are located close to one another, but the foothill yellow-legged frog populations within them appear to have lost genetic connectivity. Although the stream flows are not regulated by dams, the risk of population decline continues to be medium or high under current conditions due to the combination of threats identified above altering habitat and impacting the DPS. Furthermore, the close proximity of the stream segments to each other makes the South Coast DPS especially vulnerable to extirpation from a single catastrophic event. Like the other DPSs within the southern portion of the species' range, the area associated with the South Coast DPS is subject to reduced precipitation and drying, which (1) shortens the hydroperiod and negatively affects habitat elements that are hydrology-dependent; (2) limits recruitment, survival, and connectivity; and (3) exacerbates the effects of other threats, such as predation and wildfire. In addition, the current occupancy within the DPS is extremely low and the threats acting on the DPS are of such extent and magnitude to currently cause significant declines. As a result, we find that the magnitude and imminence of threats facing the South Coast DPS of the foothill yellow-legged frog place the DPS in danger of extinction now, and therefore a threatened status is not appropriate. Thus, after assessing the best scientific and commercial information available, we determine that currently the South Coast DPS of the foothill yellow-legged frog is in danger of extinction throughout all of

its range.

Status of the South Sierra DPS and South Coast DPS Throughout a Significant Portion of Their Ranges

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. We have determined that the South Sierra DPS and the South Coast DPS of the foothill yellow-legged frog are in danger of extinction throughout all of their ranges, and accordingly we did not undertake an analysis of any significant portion of the range for these two DPSs. Because both DPSs warrant listing as endangered throughout all of their ranges, our determination does not conflict with the decision in Center for Biological Diversity v. Everson, 2020 WL 437289 (D. DC 2020), in which the court vacated the aspect of the Final Policy on Interpretation of the Phrase "Significant Portion of its Range" in the Endangered Species Act's Definitions of "Endangered Species" and "Threatened Species" (79 FR 37578; July 1, 2014) that provided the Service does not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range.

Determination of Status for the South Sierra DPS and South Coast DPS

Our review of the best available scientific and commercial information indicates that the South Sierra DPS and the South Coast DPS meet the Act’s definition of endangered species. Therefore, we propose to list the South Sierra DPS and the South Coast DPS as endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

Status of the North Feather DPS and Central Coast DPS of the Foothill Yellow-Legged Frog Throughout All of Their Ranges

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the North Feather and Central

Coast DPSs of the foothill yellow-legged frog and their habitat. Below we summarize our assessment of status of the North Feather DPS and Central Coast DPS under the Act.

North Feather DPS: Numerous threats are currently acting on the North Feather DPS. The North Feather DPS is within the most hydrologically altered part of the foothill yellow-legged frog's range (Factor A) and potentially is among the most impacted by the latent effects from historical mining (Hayes *et al*. 2016, pp. 53–54) (Factor A). Other threats to the DPS include nonnative species (bullfrogs and crayfish) (Factor C), impacts to habitat (agriculture, urbanization, severe wildfire) (Factor A), recreation (Factor E), the effects of climate change (Factor E), and inadequacy of regulatory mechanisms (Factor D). After evaluating threats to the DPS and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we conclude that under current conditions, resiliency, redundancy, and representation for the North Feather DPS are reduced.

The North Feather DPS occupies a relatively small area and several streams or occurrences have been extirpated from past impacts (eastern portion of range, southwestern area near Lake Oroville, and some occurrences in northern Butte County) (CDFW 2020, dataset, entire; Service 2021, figure 49, p. 131). The North Feather DPS also has the highest average relative risk of population decline with only 16 (15 percent) of the 109 analyzed stream segments in the low risk category and 34 stream segments (31 percent) in the high risk category. Overall abundance of foothill yellow-legged frogs for the North Feather DPS is largely unknown, but egg mass densities are very low in the two regulated stream reaches that have long-term monitoring (Rose *et al*. 2020, pp. 63–64, table 1). For example, sections of the Cresta reach of the North Feather River that historically had relatively high numbers of foothill yellow-legged frog egg masses did not have egg masses or were extremely reduced for several years (2006–2017) (CDFW 2019, p. 31; Dillingham 2019, p. 7).

Under current conditions, resiliency in the North Feather DPS is reduced, largely because of the DPS's occupation of a small geographic area, range contraction, the relatively high risk of the DPS's decline, and the area's high degree of hydrological alteration. However, the North Feather DPS still currently contains a relatively high proportion of occurrence records with 42 percent of all known occurrences being from the 2010–2020 timeframe (Service 2021, table 10, figure 49, pp. 125, 131). As a result, occupancy for the North Feather DPS is good, based on a majority of records being within the 2000–2020 timeframe, but abundance is low where there has been population monitoring. Current redundancy is limited in the North Feather clade. The North Feather DPS not only occupies the smallest area, but its occupied stream segments are not well-distributed over the geographical area it occupies. Current representation of the DPS is most likely reduced due to past loss of populations.

In 2001, the FERC issued an order to the licensee responsible for flow regulation on the Cresta and Poe reaches of the North Feather River (Rock Creek–Cresta Hydroelectric Project (FERC Project No. 1962) Pacific Gas and Electric Company (PG&E)). The order required PG&E to develop a plan to ensure recreational and pulse flow releases did not negatively impact the foothill yellow-legged frog. The order also required the establishment of an Ecological Resources Committee (ERC) to evaluate effects of flows and provide adaptive management strategies if flows had a negative impact on the foothill yellow-legged frog populations within the two reaches. In 2006, flow releases for recreational boating were discontinued on the Cresta reach due to possible impacts from flows resulting in low foothill yellow-legged egg masses that year. In 2009 and again in 2014, modified flow programs were implemented to mimic natural flow regimes by reducing flows in spring and summer (April through the foothill yellow-legged frog's breeding season) (GANDA 2018, pp. 1–2). We expect these measures to continue due to the establishment of the ERC on monitoring impacts to foothill yellow-

legged frog populations on the two reaches. As a result, there are some signs of improved abundance since 2018, in the Cresta reach of the North Feather River following the above described modifications of the regulated flow regime to more natural conditions. Additional conservation efforts have been implemented to improve abundance of the North Feather DPS including in-situ and ex-situ rearing of foothill yellow-legged frogs for reintroduction (GANDA 2018, pp. 1–3, 13, table 2; Dillingham 2019, pp. 7–9; Rose *et al.* 2020, pp. 63–64, 76, table 1, figure 4). The Forest Service has noted habitat improvements in breeding areas of the Cresta reach and expects abundances and breeding activity to continue to increase in response to conservation efforts associated with in-situ and ex-situ rearing efforts (Dillingham 2019, pp. 7–9). In addition, the environmental condition of streams in the range of the North Feather DPS exhibit colder stream temperatures. These cooler water temperatures, although not currently preferable for the foothill yellow-legged frog, may help to provide climatic resiliency during periods of hot weather that may increase stream temperatures and may extend breeding and rearing timeframes. In addition, the existing conservation efforts to improve populations and regulatory measures to benefit habitat conditions as described above currently document improvements to the DPS's overall current condition. After evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we have determined that despite the current condition of the DPS being reduced, the population and habitat factors used to determine the resiliency, representation, and redundancy for the DPS have not been reduced to such a degree to consider the North Feather DPS currently in danger of extinction throughout its range.

However, threat conditions in the future are likely to substantially impact populations of the North Feather DPS. Because of the current cold stream temperatures, future climatic conditions that may increase stream temperatures may potentially benefit many of the North Feather DPS populations; however, the negative effects of increases in

streamflow variability due to climate change (i.e., drought/flood events, snow/rain events) and residual environmental stochasticity likely outweigh the benefit of any warmer stream temperatures. Increased water demand and anticipated additional regulation to an already highly regulated hydrologic condition of the DPSs habitat will further limit the DPS's capability to maintain adequate population sizes to support the DPS's metapopulation structure. Nonnative species (bullfrogs and crayfish) will continue to impact the DPS and their impacts may increase as temperatures warm, allowing for spread of warm water species such as bullfrogs and smallmouth bass. Trends indicate that the amount of area severely burned annually by wildfires has been growing sharply in the range of the North Feather DPS (Service 2021, figures 38 and 39, pp. 105–106) and negative consequences from wildfire-related sedimentation to foothill yellow-legged frog reproduction have been documented in this DPS (Service 2021, pp. 86–87). The populations of the North Feather DPS occupy an area small enough that a large catastrophic event, such as a severe wildfire or prolonged drought, could result in a severe reduction in population size and extent for the DPS. Future resiliency for the North Feather DPS will be markedly reduced as a result of these increases in threats and increases in the synergistic effects of threat interactions. Thus, the projected increases in average relative risk of decline under future conditions under the mean change scenario are likely to decrease occupancy, abundance, and connectivity, with resiliency being markedly reduced from the DPS's current condition, putting the North Feather DPS at risk of functional extirpation or extirpation within 40 years.

As a result of the DPS having a large percentage (42 percent) of recently occupied occurrences (2010–2020) within the occupied stream segments, and implementation of conservation measures to reduce the effects of altered stream hydrology and provide for an increase in populations, we have determined that the current condition of the DPS, although reduced, still exhibits sufficient resiliency, redundancy, and representation and

would provide for, at a minimum, pockets of favorable conditions that allow the North Feather DPS to currently sustain its existing populations. However, future impacts from the threats facing the DPS are likely to cause declines in the DPS's population size and distribution. Thus, after assessing the best available information, we conclude that the North Feather DPS of the foothill yellow-legged frog is not currently in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range.

Central Coast DPS: Numerous threats are currently acting on the Central Coast DPS including altered hydrology (Factor A), disease (Factor C), drought (Factor A), nonnative bullfrogs (Factor C), impacts to habitat (urbanization (including development and roads), agriculture, trespass cannabis cultivation, extreme floods, and wildfire) (Factor A), recreation (Factor E), the effects of climate change (Factor E), and inadequacy of regulatory mechanisms (Factor D). Human land use and population (urban development) in the northern portions of the DPS's range are high, and the proportion of forest and shrub cover across the DPS's range is low, with large areas being made up of lower elevation open oak woodlands or foothill grassland habitats. Seasonal precipitation within the range of the Central Coast DPS is extremely variable year-to-year, making stream habitat for the Central Coast DPS subject to drying. This, in turn, shortens the breeding season; negatively affects habitat elements that are hydrology-dependent; limits recruitment, survival, and connectivity; and exacerbates the effects of other threats (e.g., wildfire, drought, nonnative predators, disease, and the effects of climate change). However, this variability has also resulted in the Central Coast area of California (including the area occupied by the Central Coast DPS) containing a high number of freshwater species that have evolved adaptations to their environment (Howard *et al*. 2013, p. 5). Below we summarize the resiliency, redundancy, and representation of the Central Coast DPS.

The Central Coast DPS has undergone historical range contraction in portions of its northern (Contra Costa, Alameda, San Mateo, and northern Santa Cruz Counties) and central (southern Santa Clara and northern San Benito Counties) regions. Currently, two clusters of stream segments have had recent (2000–2020) detections of the species, one cluster in the southern part and one cluster in the northern part of the DPS's range (Service 2021, figure 52, p. 137). Population size and abundance for the Central Coast DPS have been historically, and continue to be, small, with those populations in unregulated streams being larger and more productive (Service 2021, pp. 136–137 (8.2 Central Coast)). The southern cluster appears to have functional and genetic connectivity (McCartney-Melstad *et al*. 2018, p. 117, figure 3), which assists in maintaining the cluster's metapopulation integrity. The southern cluster also has fewer human-caused threats (urbanization, high-level recreation) due to its distance away from highly human-populated areas and its location on public lands (BLM's Clear Creek Management Area (CCMA)). Populations within the CCMA in San Benito and Fresno Counties are being monitored and managed by BLM, and currently appear to be self-sustaining (BLM 2014, pp. 4-77, 99–100). The northern cluster is proximate to highly urbanized areas of the south San Francisco Bay area and San Jose, California. The northern cluster also exhibits some genetic differentiation among subpopulations, indicating a lack of functional connectivity (McCartney-Melstad *et al*. 2018, p. 117, figure 3). However, two HCP/NCCPs (East Contra Costa and Santa Clara Valley) (Jones & Stokes 2006, entire; ICF Jones & Stokes 2009, entire) that identify the foothill yellow-legged frog as a covered species have been approved and implemented. These plans assist in ameliorating the current threats acting on the northern populations of the Central Coast DPS and help conserve the DPS and its habitat within their jurisdictional boundaries.

Current resiliency of the Central Coast DPS is substantially reduced due to past impacts limiting connectivity between populations and existing populations having

smaller population abundance and breeding (Rose *et al*. 2020, p. 63, table 1). The average risk of population decline for the Central Coast DPS is considered high and numerous threats are currently acting on the DPS (altered hydrology, drought, nonnative species, disease, and urbanization). The current overall redundancy for the Central Coast DPS is considered adequate to maintain the existing populations of the DPS. This is because the Central Coast DPS has numerous occupied stream segments that are spatially distributed across the DPS's range, and those stream segments exhibit variable environmental conditions providing for, at a minimum, refugia for the population. As a result of this distribution, the likelihood that a single catastrophic event would impact a significant proportion of the Central Coast DPS's populations to the point of extirpation or functional extirpation is extremely small. Current representation for the Central Coast DPS is considered sufficient to maintain its adaptive capacity. The Central Coast DPS has evolved in an area with high climatic variability and is most likely adapted to environmental changes. The Central Coast DPS is also one of the most genetically divergent for the foothill yellow-legged frog, indicating that the DPS still contains a significant amount of the taxon's overall genetic diversity.

In the future, the average risk of decline for the existing populations is expected to increase by 14 percent and the number of populations at high risk of decline are expected to increase by 69 percent, under the mean change scenario. These changes are a result of increases in threats such as climate-induced demand for surface waters that is projected to increase by 5 to 20 percent (from 1900–1970 levels) by mid-century (2050) (Averyt *et al*. 2013, p. 7, figure 7). Future increases in severe wildfires are expected. Despite wildfire trends in the Central Coast DPS being stable between 1950 and 2018 (Service 2021, Figure 38), recent events such as the fires in 2020 in the San Mateo–Santa Cruz Unit (CZU) (35,009 hectares (ha) (86,509 acres (ac)) (Santa Cruz and San Mateo Counties) and Santa Clara Unit (SCU) (160,508 ha (396,624 ac)) (Santa Clara, Alameda, Stanislaus

Counties) Lightning Complex are examples of expected increasing trends in wildfire activity in the future (CALFIRE 2021, entire). Under the lower change scenario, the Central Coast DPS's resiliency would be slightly reduced. Under the mean change scenario, resiliency would be markedly reduced from current condition due to reductions in population numbers and distribution (reduction in redundancy). This reduction in resiliency under the mean change scenario would put the Central Coast DPS at risk of functional extirpation or extirpation in 40 years.

After evaluating threats to the Central Coast DPS and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we find that the Central Coast DPS of the foothill yellow-legged frog currently sustains numerous populations and contains habitat distributed throughout the DPS's range (redundancy). These widely distributed populations provide for the genetic and ecological representation for the DPS across its range. Therefore, the current resiliency, redundancy, and representation are sufficient to prevent the current threats acting on the Central Coast DPS from causing it to be in danger of extinction anywhere within its range. Thus, the Central Coast DPS of the foothill yellow-legged frog is not currently in danger of extinction throughout its range, and therefore, the Central Coast DPS does not meet the Act's definition of endangered. However, based on our projections of future occupancy (which are currently low and show poor connectivity), modeled risk of decline assessments from the PVA, and the existing and increased threats in the future on the DPS from increasing water demand, increases in wildfire frequency and intensity due to climate change conditions will further impact abundance and connectivity of populations and cause the DPS's habitat to become increasingly less able to support foothill yellow-legged frog populations into the future. Thus, after assessing the best available information, we conclude that the Central Coast DPS of the foothill yellow-legged frog is likely to become in danger of extinction within the foreseeable future throughout all of its range.

Status of the North Feather DPS and Central Coast DPS of the Foothill Yellow-Legged Frog Throughout a Significant Portion of Their Ranges

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. The court in *Center for Biological Diversity* v. *Everson*, 2020 WL 437289 (D.D.C. Jan. 28, 2020) (*Center for Biological Diversity*), vacated the aspect of the Final Policy on Interpretation of the Phrase "Significant Portion of Its Range" in the Endangered Species Act's Definitions of "Endangered Species" and "Threatened Species" (79 FR 37578; July 1, 2014) that provided that the Service does not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range. Therefore, we proceed to evaluating whether the North Feather DPS or Central Coast DPS is endangered in a significant portion of its range—that is, whether there is any portion of either DPSs' range for which both (1) the portion is significant; and (2) the species is in danger of extinction in that portion. Depending on the case, it might be more efficient for us to address the "significance" question or the "status" question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of either DPS's range.

Following the court's holding in *Center for Biological Diversity*, we now consider whether there are any significant portions of the species' range where either DPS is in danger of extinction now (i.e., endangered). In undertaking this analysis for the North Feather DPS and Central Coast DPS, we choose to address the status question first—we consider information pertaining to the geographic distribution of both the species and the threats that the two DPSs face to identify any portions of either DPS's range where either is endangered.

For North Feather DPS and Central Coast DPS, we considered whether the threats are geographically concentrated in any portion of the DPS's ranges at a biologically meaningful scale. We examined the following threats for the North Feather DPS: altered stream hydrology, latent effects from historical mining, nonnative species, impacts to the DPS's habitat (agriculture, urbanization, wildfire), recreation, and the effects of climate change, including cumulative effects. For the Central Coast DPS, we examined: altered stream hydrology, disease, drought, nonnative species, impacts to habitat (urbanization (including roads and recreation), agriculture, trespass cannabis cultivation, extreme floods, and wildfire), and the effects of climate change, including cumulative effects. The major driving forces of altered stream hydrology, wildfire, disease, nonnative species, and the effects of climate change are occurring throughout each DPS at similar levels and we did not find a concentration of any of these threats in any portion of either the North Feather or Central Coast DPS's range at a biologically meaningful scale.

Thus, there are no portions of the North Feather DPS's or Central Coast DPS's range where the threats facing the species are concentrated to a degree where the species in that portion would have a different status from its overall DPS status. Therefore, no portion of the North Feather DPS's or Central Coast DPS's range provides a basis for determining that the North Feather DPS or Central Coast DPS is in danger of extinction in a significant portion of its range. We determine that the two DPSs are likely to become in danger of extinction within the foreseeable future throughout all of their ranges. This does not conflict with the courts' holdings in *Desert Survivors* v. *U.S. Department of the Interior*, 321 F. Supp. 3d 1011, 1070-74 (N.D. Cal. 2018), and *Center for Biological Diversity* v. *Jewell*, 248 F. Supp. 3d 946, 959 (D. Ariz. 2017) because, in reaching this conclusion, we did not need to consider whether any portions are significant and therefore did not apply the aspects of the Final Policy's definition of "significant" that those court decisions held were invalid.

Determination of Status for the North Feather DPS and Central Coast DPS of the Foothill Yellow-Legged Frog

Our review of the best scientific and commercial information available indicates that the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog are likely to become endangered species within the foreseeable future throughout their ranges and thus meet the Act's definition of threatened species. Therefore, we propose to list the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog as threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

Status of the North Coast DPS and North Sierra DPS of the Foothill Yellow-Legged Frog Throughout All of Their Ranges

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the North Coast DPS and the North Sierra DPS of the foothill yellow-legged frog and its habitat. Below we summarize our assessment of status of the North Coast DPS and the North Sierra DPS under the Act. In the SSA report, we provided information regarding the current and future conditions of the North Coast DPS in Oregon and California as separate analysis units. To be consistent, we describe the conditions of the Oregon and California portions of the DPS separately below, but we combine these analyses and present the DPS as one entity for our determination of overall status under the Act.

North Coast DPS (*Oregon*): The major threats that are affecting the foothill yellow-legged frog in the North Coast DPS in Oregon include altered hydrology (Factor A), nonnative species (Factor C), agriculture (including water diversion and fluctuation caused by irrigation) (Factor A), mining (Factor A), urbanization (including development and roads) (Factor A), and recreation (Factor E).

Current conditions of the North Coast DPS in Oregon include legacy impacts from historical habitat loss and alteration of habitat and resulting range contraction. The current extent of the DPS's range in Oregon has been fragmented and the populations remaining have lost some connectivity, with smaller populations sometimes being isolated. Evidence of this isolation has been supported by genetic research that found the DPS in Oregon subdivided into three genetic groups based on locality (McCartney-Melstad *et al*. 2018, p. 117, figure 3). Abundance information also appears to indicate the fragmented populations are lower in abundance than past abundance estimates (Borisenko and Hayes 1999, pp. 20–21; Olson and Davis 2009, p. 26). Although occupancy and connectivity are poor for the DPS in Oregon as a whole, there appear to be some strongholds for the foothill yellow-legged frog (Service 2021, figure 55, p. 151). The areas in the central and southwestern portions of the DPS in Oregon appear to be most stable with numerous occupied stream segments that are both close together and at a relatively low risk of decline. According to the PVA, the average relative risk of population decline in the North Coast DPS in Oregon is the second-lowest across all DPSs. In addition, the majority of stream segments in this unit are in the low relative risk of decline category. This is partly because most stream segments in Oregon do not have regulated flows which are associated with dams. In addition, conservation efforts such as rangewide conservation planning and habitat connectivity prioritization are focusing management on the North Coast DPS in Oregon (Service 2021, table 9, pp. 117–120). Although habitat impacts resulting from present-day threats are currently negatively affecting the North Coast DPS in Oregon, the DPS in Oregon still has a sufficient degree of resiliency, redundancy, and representation, due to the lessened magnitude and extent of threats acting on the DPS, such that we do not consider these present-day effects to place the species in danger of extinction.

North Coast DPS-California: Altered stream hydrology (Factor A) is among the most impactful threats to the North Coast DPS in California. Other major threats that likely have or are contributing to localized declines in the DPS in California include nonnative species (Factor C), habitat impacts from agriculture, mining, and urbanization (including development and roads) (Factor A), and recreation (Factor E). Trespass cannabis cultivation (Factor A) is also an extensive threat in the North Coast DPS in California (CDFW 2019b, pp. 97–98). Illegal water diversions and pesticides for illegal cannabis are reportedly linked to local declines of foothill yellow-legged frogs in the Eel River and South Fork Trinity River (Service 2019, p. 33).

Despite several documented local extirpations, the North Coast DPS in California contains the most abundant foothill yellow-legged frog populations and the majority (1,443 of 2,425 for the species) of stream segments that have had recent (2000–2020) detections of the species (Service 2021, Table 10, Figure 48). Stream segments with recent detections also have good connectivity and are distributed over a large area. The North Coast DPS in California also contains a large number of stream segments (382) in the low risk of decline category. In addition, conservation efforts such as rangewide conservation planning and other regulatory measures to manage streams to benefit the North Coast DPS are currently being implemented in California (Service 2021, table 9, pp. 117–120). Although habitat impacts resulting from present-day threats are currently negatively affecting the North Coast DPS in California, the DPS in California still has a sufficient degree of resiliency, redundancy, and representation, due to the health and number of populations and magnitude and extent of threats acting on the DPS, such that we do not consider these present-day effects to place the DPS in danger of extinction.

After assessing the best scientific and commercial information available, and based on the information on the North Coast DPS's overall current condition above, we have determined that the North Coast DPS (in California and Oregon) of the foothill

yellow-legged frog is not currently in danger of extinction throughout all of its range. Below, we review the North Coast DPS's future condition and status.

Future Condition of the North Coast DPS: Over the next 40 years (our timeframe of foreseeable future), the projected increases in risk of decline and the increasing risk of serious threats indicate that the resiliency of the North Coast DPS will decrease in the future (Service 2021, table 19, pp. 180–181). This decline is expected to be largely related to the altered stream hydrology (in California) in the mainstem river systems and threats associated with severe wildfire events exacerbated by changes in climatic conditions. However, the North Coast DPS in Oregon has the lowest risk of decline under the mean and higher change scenarios and has the second-lowest risk of decline under the lower change scenario. In addition, the percent forest and shrub cover for the entire DPS is projected to change very little by 2060 (less than 0.3 percent of total area under the mean change scenario) in the North Coast DPS overall (California and Oregon data summarized together) (Sleeter and Kreitler 2020, unpublished data). This would result in a relatively stable upland habitat conditions for the DPS over this timeframe. This DPS overall is also likely to be more resilient to projected changes in climate variables (i.e., stream temperature and annual streamflow). For example, projected increases in stream temperature could increase population growth rates in those streams that tend to be cooler than in the rest of the species' range. In addition, although resiliency for the North Coast DPS will be reduced, the reduction will not be significantly different from current condition. This is mostly because the North Coast DPS has a large number of occupied stream segments, contains populations with high abundances, is distributed relatively uniformly across a large geographic area, and has good connectivity between populations, making it able to withstand the anticipated variation and increase of stochastic events. Regulatory mechanisms such as the Forest Service's and BLM's Sensitive Species Program and habitat management programs under the Northwest Forest

Plan which provides for species management and habitat protection for activities on their lands will continue to be implemented for a large portion of the DPS. As a result, the North Coast DPS's resiliency would most likely be only slightly reduced from the threats it will face in the foreseeable future over the next 40 years due to its heightened current condition. Therefore, due to the DPS's current and projected high occupancy level, its abundance, connectivity, and distribution of populations within the DPS as well as implementation of measures to reduce threats, we have determined that the North Coast DPS will continue to have a sufficient degree of resiliency, redundancy, and representation such that we do not anticipate the future threats to limit the DPS's ability to maintain populations in the wild.

After review of the threats identified above and cumulative effects facing the North Coast DPS, as well as existing conservation measures, we conclude that threats have likely impacted individuals or localized populations of the North Coast DPS. However, the magnitude and extent of these impacts into the future will not significantly impact the resiliency, representation, or redundancy for the DPS or result in a decline in the overall distribution or general demographic condition of the DPS such that it is likely to become in danger of extinction in the foreseeable future throughout the DPS's range.

North Sierra DPS: The major threats that likely have or are contributing to declines of the foothill yellow-legged frog in the North Sierra DPS include altered stream hydrology (Factor A), nonnative species (Factor C), habitat impacts (agriculture, mining, urbanization (including development and roads) (Factor A) and recreation (Factor E), and the effects of climate change (Factor E). The North Sierra DPS is in the most hydrologically altered part of the foothill yellow-legged frog's range and contains a high density of hydropower dams (CDFW 2019b, p. 97). While the North Sierra DPS has a high proportion of forest and shrub cover (86 percent), it may be affected by agricultural activities (vineyards) adjacent to habitat in the foothill portions of the northern Central

Valley (Service 2021, supplementary figure 1, p. 224). The northern Sierra Nevada (North Feather and North Sierra DPSs) is also suspected to be the most impacted from the latent effects from historical mining (Hayes *et al.* 2016, pp. 53–54).

Despite the threats acting on the North Sierra DPS, its populations have the lowest risk of decline across the DPS's range due to it having a large proportion of occupied streams containing populations that are both robust and stable. The majority (65 percent) of the DPS's 278 analyzed stream segments are currently in the low relative risk category. The North Sierra DPS is made up of a dense network of occupied stream segments that are distributed across the range of the DPS. There are few documented extirpations of occurrences in the North Sierra DPS. As a result, the resiliency, redundancy, and representation across the DPS are considered sufficient to reduce the impact of threats and currently maintain populations in the wild.

In the future, the North Sierra DPS is expected to decline due to alterations associated with regulated water flows. However, these declines are not expected to impact the North Sierra DPS to such a degree that populations would be significantly impacted. The PVA determined that the North Coast DPS would have the lowest risk of decline under the lower change scenario and the second-lowest risk of decline under the mean and higher change scenarios. As a result, we expect resiliency, redundancy, and representation across the DPS to remain sufficient for the DPS to maintain populations in the wild into the foreseeable future.

We have reviewed the current threats identified above and cumulative effects facing the North Coast and North Sierra DPSs, and evaluated the condition of the resiliency, representation, and redundancy for each of the DPSs. Based on the favorable conditions currently measured by the resiliency, redundancy and representation across the DPSs, the threats acting on the two DPSs are not of such magnitude, extent, and

imminence that they are causing the two DPSs to be in danger of extinction now throughout their ranges.

The future threats acting on and driving the status of the two DPSs include altered hydrology (either through stream flows or past stream alterations) and the effects of climate change, which may result in increased hydrological changes or severity of habitat loss from wildfire impacts. We anticipate that, although the risk of decline will increase due to the threats acting on the two DPSs into the future, the two DPSs' resiliency, representation, and redundancy are projected to sufficiently reduce the effect of future impacts to such a degree that populations of both DPSs would be able maintain viability into the future.

Thus, after assessing the best scientific and commercial information available, we conclude that the North Coast DPS (in northern California and Oregon) and the North Sierra DPS (located primarily in Yuba, Sierra, Nevada, and Placer Counties, California) are not currently in danger of extinction and not likely to become in danger of extinction within the foreseeable future throughout their respective ranges.

Status of the North Coast DPS and North Sierra DPS of the Foothill Yellow-Legged Frog Throughout a Significant Portion of Their Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. Having determined that the North Coast DPS and North Sierra DPS are not in danger of extinction or likely to become so in the foreseeable future throughout all of their respective ranges, we now consider whether either may be in danger of extinction or likely to become so in the foreseeable future in a significant portion of their respective ranges—that is, whether there is any portion of the DPSs' ranges for which it is true that both (1) the portion is significant; and (2) the DPS is in danger of extinction now or likely to become so in the foreseeable future in that portion.

Depending on the case, it might be more efficient for us to address the "significance" question or the "status" question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the DPS's range.

In undertaking this analysis for the North Coast DPS and North Sierra DPS, we choose to address the status question first—we consider information pertaining to the geographic distribution of both the DPSs and the threats that the DPSs face to identify any portions of the range where the DPSs are endangered or threatened.

For the North Coast DPS and North Sierra DPS, we considered whether the threats are geographically concentrated in any portion of the DPSs' ranges at a biologically meaningful scale. We examined the following threats: hydrological alteration of streams (Factor A), latent effects from historical mining (Factor A), predation from nonnative species (bullfrogs and crayfish) (Factor C), other impacts to habitat (agriculture, urbanization, severe wildfire) (Factor A), recreation (Factor E), and the effects of climate change (Factor E), including cumulative effects. In our analysis, we did not find any portion of either the North Coast DPS's range or the North Sierra DPS's range where the threats identified above are currently acting at a biologically meaningful scale such that any portion of the DPSs' ranges may be endangered, or where threats are likely to act on either DPS into the future such that any portion may be threatened. Occupied stream segments are distributed throughout each of the DPSs, and connectivity in the majority of each DPS is considered to be good except within the Oregon portion of the North Coast DPS. However, the Oregon portion also has fewer regulated streams, and populations, although small, are in a low risk of decline both now and into the future. Therefore, no portion of the two DPSs' ranges provides a basis for determining that either DPS is in danger of extinction now or likely to become so in the foreseeable future in a

significant portion of its range, and we find that the DPSs are not in danger of extinction now or likely to become so in the foreseeable future in any significant portion of their ranges. This does not conflict with the courts' holdings in *Desert Survivors* v. *U.S. Department of the Interior*, 321 F. Supp. 3d 1011, 1070-74 (N.D. Cal. 2018), and *Center for Biological Diversity* v. *Jewell*, 248 F. Supp. 3d 946, 959 (D. Ariz. 2017) because, in reaching this conclusion, we did not need to consider whether any portions are significant and therefore did not apply the aspects of the Final Policy's definition of "significant" that those court decisions held were invalid.

Determination of Status of the North Coast DPS and North Sierra DPS of the Foothill Yellow-Legged Frog

Our review of the best scientific and commercial information available indicates that the North Coast DPS and North Sierra DPS of the foothill yellow-legged frog do not meet the Act's definition of an endangered species or a threatened species in accordance with sections 3(6) and 3(20) of the Act. Therefore, we find that listing the North Coast DPS and North Sierra DPS of the foothill yellow-legged frog under the Act is not warranted at this time.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness, and conservation by Federal, State, Tribal, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and other countries and calls for recovery actions to be carried out for listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Section 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning consists of preparing draft and final recovery plans, beginning with the development of a recovery outline and making it available to the public within 30 days of a final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery plan also identifies recovery criteria for review of when a species may be ready for reclassification from endangered to threatened ("downlisting") or removal from protected status ("delisting"), and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our website (*http://www.fws.gov/endangered*), or from our Sacramento Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

If any of the DPSs identified above are listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost-share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the State of California would be eligible for Federal funds to implement management actions that promote the protection or recovery of the DPSs. Information on our grant programs that are available to aid species recovery can be found at: *https://www.fws.gov/grants*.

Although the four DPSs are only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery efforts for this species. Additionally, we invite you to submit any new information on this species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in

destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

Examples of Federal agency actions within the species' habitat within the DPSs that may require conference or consultation or both, as described in the preceding paragraph, include but are not limited to management and any other landscape-altering activities on Federal lands administered by the U.S. Fish and Wildlife Service, Forest Service, BLM, and National Park Service; issuance of section 404 Clean Water Act (33 U.S.C. 1251 et seq.) permits by the U.S. Army Corps of Engineers; construction and maintenance of roads, bridges, or highways by the Federal Highway Administration; water management and conveyance activities by the Bureau of Reclamation; and licensing for hydropower and safety of dams by the FERC.

South Sierra DPS and South Coast DPS – Proposed Endangered Status

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to endangered wildlife. The prohibitions of section 9(a)(1) of the Act, codified at 50 CFR 17.21, make it illegal for any person subject to the jurisdiction of the United States to take (which includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these) endangered wildlife within the United States or on the high seas. In addition, it is unlawful to import; export; deliver, receive, carry, transport, or ship in interstate or foreign commerce in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any species listed as an endangered species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply

to employees of the Service, the National Marine Fisheries Service, other Federal land management agencies, and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22. With regard to endangered wildlife, a permit may be issued for the following purposes: For scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities. The statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

It is our policy, as published in the *Federal Register* on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing.

Because activities being implemented in the range of the species are variable and have variable impacts depending on the nature of the project, we are unable at this time to identify any specific activities within the range of the species that would not constitute a violation of section 9, as effects of any actions on the species are fact-pattern specific. However, actions whose effects do not extend into foothill yellow-legged frog habitat are unlikely to result in section 9 violations.

Based on the best available information, the following activities may result in a violation of section 9 of the Act if they are not authorized in accordance with applicable law; this list is not comprehensive:

Activities that the Service believes could potentially harm the foothill yellow-legged frog and result in “take” include, but are not limited to:

(1) Unauthorized handling or collecting of the species;

(2) Destruction/alteration of the species' habitat by discharge of fill material, draining, ditching, tiling, pond construction, stream channelization or diversion, or diversion or alteration of surface or ground water flow;

(3) Inappropriate livestock grazing that results in direct or indirect destruction of riparian habitat;

(4) Pesticide applications in violation of label restrictions;

(5) Introduction of nonnative species that compete with or prey upon foothill yellow-legged frogs, such as the introduction of nonnative bullfrogs or nonnative fish; and

(6) Modification of the channel or water flow of any stream or removal or destruction of vegetation or stream substrate in any body of water in which the foothill yellow-legged frog is known to occur.

Questions regarding whether specific activities would constitute a violation of section 9 of the Act should be directed to the Sacramento Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

North Feather DPS and Central Coast DPS – Proposed Threatened Status

It is our policy, as published in the *Federal Register* on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing. The discussion below regarding protective regulations under section 4(d) of the Act for the proposed threatened North Feather DPS and Central Coast DPS complies with our policy.

II. Proposed Rule Issued Under Section 4(d) of the Act for the North Feather DPS and the Central Coast DPS of the Foothill Yellow-Legged Frog

Background

Section 4(d) of the Act contains two sentences. The first sentence states that the Secretary shall issue such regulations as she deems necessary and advisable to provide for the conservation of species listed as threatened. The U.S. Supreme Court has noted that statutory language like "necessary and advisable" demonstrates a large degree of deference to the agency (see *Webster* v. *Doe*, 486 U.S. 592 (1988)). Conservation is defined in the Act to mean the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Additionally, the second sentence of section 4(d) of the Act states that the Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants. Thus, the combination of the two sentences of section 4(d) provides the Secretary with wide latitude of discretion to select and promulgate appropriate regulations tailored to the specific conservation needs of the threatened species. The second sentence grants particularly broad discretion to the Service when adopting the prohibitions under section 9.

The courts have recognized the extent of the Secretary's discretion under this standard to develop rules that are appropriate for the conservation of a species. For example, courts have upheld rules developed under section 4(d) as a valid exercise of agency authority where they prohibited take of threatened wildlife, or include a limited taking prohibition (see *Alsea Valley Alliance* v. *Lautenbacher*, 2007 U.S. Dist. Lexis 60203 (D. Or. 2007); *Washington Environmental Council* v. *National Marine Fisheries Service*, 2002 U.S. Dist. Lexis 5432 (W.D. Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (see *State of Louisiana* v. *Verity*, 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history of the Act, "once an animal is on the threatened list, the Secretary has an almost infinite number of options available to him [or her] with regard to the permitted activities for those species. He [or

she] may, for example, permit taking, but not importation of such species, or he [or she] may choose to forbid both taking and importation but allow the transportation of such species" (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Exercising this authority under section 4(d), we have developed proposed rules that are designed to address the conservation needs of the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog. Although the statute does not require us to make a "necessary and advisable" finding with respect to the adoption of specific prohibitions under section 9, we find that these rules as a whole satisfy the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog. As discussed above under **Summary of Biological Status and Threats**, we have concluded that the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog are likely to become in danger of extinction within the foreseeable future throughout their respective ranges primarily due to threats associated with altered stream hydrology, nonnative species, impacts to habitat (agriculture, mining, urbanization, roads, recreation), disease, drought, extreme floods, high-severity wildfire, and the exacerbation of threats from the effects of climate change. The provisions of this proposed 4(d) rule would promote conservation of the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog by encouraging management of the species' stream habitat and landscape in ways that meet both resource management considerations and the conservation needs of the species. The provisions of this proposed rule are one of many tools that we would use to promote the conservation of the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog. This proposed 4(d) rule would apply only if and when we make final the listing of the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog as threatened species.

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. In addition, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of proposed critical habitat.

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with the Service. Examples of actions that are subject to the section 7 consultation process are actions on State, Tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act, a license from the Federal Energy Regulatory Commission under the Federal Power Act, or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat—and actions on State, Tribal, local, or private lands that are not federally funded, authorized, or carried out by a Federal agency—do not require section 7 consultation.

This obligation does not change in any way for a threatened species with a species-specific 4(d) rule. Actions that result in a determination by a Federal agency of "not likely to adversely affect" continue to require the Service's written concurrence and actions that are "likely to adversely affect" a species require formal consultation and the formulation of a biological opinion.

Provisions of the Proposed 4(d) Rule for the North Feather DPS and the Central Coast DPS of the Foothill Yellow-Legged Frog

This proposed 4(d) rule would provide for the conservation of the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog by prohibiting the following activities, except as otherwise authorized or permitted: import or export; take; possession and other acts with unlawfully taken specimens; delivery, receipt, transportation, or shipment in interstate or foreign commerce in the course of commercial activity; or sale or offer for sale in interstate or foreign commerce. These prohibitions mirror those prohibitions afforded to endangered species under section 9(a)(1) of the Act.

In addition to the prohibited activities identified above, we also provide standard and other exceptions to those prohibitions for certain activities as described below.

We note that the long-term viability of the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog, as with many wildlife species, is intimately tied to the condition of their habitat. As described in our analysis of the species' status, one of the major threats to the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog's continued viability is habitat loss, degradation, and fragmentation resulting from past or current anthropogenic impacts or from catastrophic wildfires. The potential for an increase in frequency and severity of catastrophic wildfires from the effects of climate change subsequently increases the risk to the species posed by this threat. An additional threat is the occurrence of nonnative species that may predate upon and compete for resources with the foothill yellow-legged frog.

We have determined that actions taken by forest management entities in the range of the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog for the purpose of reducing the risk or severity of catastrophic wildfires and protecting stream habitat, even if these actions may result in some short-term or low level of localized negative effect to North Feather DPS and/or Central Coast DPS of the foothill

yellow-legged frog, will further the goal of reducing the likelihood of either DPS becoming endangered, and will also likely contribute to their conservation and long-term viability. This includes measures approved by the Service, to conduct wildfire prevention activities, non-emergency suppression activities, and other silviculture best management practices that are in accordance with an established forest or fuels management plan and that include measures that minimize impacts to the species and its habitat.

In addition, habitat restoration efforts that specifically provide for the habitat needs of the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog as approved by the Service and include measures that minimize impacts to the species and its habitat are appropriate for an exception. These activities would most likely have some limited short-term impacts but overall would provide for conservation of the two DPSs. Habitat restoration efforts focused on other species (e.g., salmonid species) are not included in this exception without written approval from the Service.

Removal and restoration of trespass cannabis cultivation sites as approved by the Service are excepted from prohibitions. These activities would benefit the foothill yellow-legged frog, especially in the Central Coast DPS area. Trespass cannabis cultivation sites cause several issues for the foothill yellow-legged frog including water diversion, pollution, sedimentation, and introduction of pesticides and fertilizers to streams occupied by the foothill yellow-legged frog. When these sites are found, they often require reclamation (waste cleanup and removal of fertilizers, pesticides, and debris) and restoration to precultivation conditions. Cleanup of these sites may involve activities that may cause localized, short-term disturbance to the North Feather DPS and Central Coast DPS of the foothill yellow-legged frog. However, the removal of pesticides and other chemicals that can affect the North Feather DPS or Central Coast DPS of the foothill yellow-legged frog and the surrounding environment is encouraged. Removal and

restoration of trespass cannabis cultivation sites is expected to have long-term benefits for resiliency of the North Feather DPS and Central Coast DPS.

Nonnative species removal would significantly increase the viability of the foothill yellow-legged frog. As discussed above, bullfrogs, nonnative fish, and nonnative crayfish contribute to foothill yellow-legged frog predation and increase competition for resources. Bullfrogs also are vectors for disease that affects the foothill yellow-legged frog. Actions with the primary or secondary purpose of removing nonnative animal species that compete with, predate upon, or degrade the habitat of the foothill yellow-legged frog that are conducted in unoccupied habitat and approved by the Service are provided as an exception. Large-scale actions that disrupt habitat or are conducted in occupied stream segments would need additional approval from the Service.

Under the Act, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Some of these provisions have been further defined in regulations at 50 CFR 17.3. Take can result knowingly or otherwise, by direct and indirect impacts, intentionally or incidentally. Regulating take would help preserve the species' remaining populations, slow their rate of decline, and decrease synergistic, negative effects from other ongoing or future threats.

We may issue permits to carry out otherwise prohibited activities, including those described above, involving threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32. With regard to threatened wildlife, a permit may be issued for the following purposes: For scientific purposes, to enhance propagation or survival, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for special purposes consistent with the purposes of the Act. The statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act and are included as standard exceptions in the proposed 4(d) rule.

We recognize the special and unique relationship with our State natural resource agency partners in contributing to conservation of listed species. State agencies often possess scientific data and valuable expertise on the status and distribution of endangered, threatened, and candidate species of wildlife and plants. State agencies, because of their authorities and their close working relationships with local governments and landowners, are in a unique position to assist the Service in implementing all aspects of the Act. In this regard, section 6 of the Act provides that the Service shall cooperate to the maximum extent practicable with the States in carrying out programs authorized by the Act. Therefore, any qualified employee or agent of a State conservation agency that is a party to a cooperative agreement with the Service in accordance with section 6(c) of the Act, who is designated by his or her agency for such purposes, would be able to conduct activities designed to conserve the foothill yellow-legged frog, that may result in otherwise prohibited take, without additional authorization.

Nothing in this proposed 4(d) rule would change in any way the recovery planning provisions of section 4(f) of the Act, the consultation requirements under section 7 of the Act, or the ability of the Service to enter into partnerships for the management and protection of the foothill yellow-legged frog. However, interagency cooperation may be further streamlined through planned programmatic consultations for the species between Federal agencies and the Service, where appropriate. We ask the public, particularly State agencies and other interested stakeholders that may be affected by the proposed 4(d) rule, to provide comments and suggestions regarding additional guidance and methods that the Service could provide or use, respectively, to streamline the implementation of this proposed 4(d) rule (see **Information Requested**, above).

III. Critical Habitat

Background

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of this Act, on which are found those physical or biological features

(a) Essential to the conservation of the species, and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Prudency Determination

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, the Secretary shall designate critical habitat at the time the species is determined to be an endangered or threatened species. Our regulations (50 CFR 424.12(a)(1)) state that the Secretary may, but is not required to, determine that a designation would not be prudent in the following circumstances:

(i) The species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat to the species;

(ii) The present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or threats to the species' habitat stem solely from causes that cannot be addressed through management actions resulting from consultations under section 7(a)(2) of the Act;

(iii) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States;

(iv) No areas meet the definition of critical habitat; or

(v) The Secretary otherwise determines that designation of critical habitat would not be prudent based on the best scientific data available.

As discussed earlier in this document, we did not identify an imminent threat of collection or vandalism identified under Factor B for this species, and identification and mapping of critical habitat is not expected to initiate any such threat. In our SSA report and this proposed listing determination for the four DPSs of the foothill yellow-legged frog, we determined that the present or threatened destruction, modification, or curtailment of habitat or range (Factor A) is a threat to the four DPSs and that the Factor A threats in some way can be addressed by the Act's section 7(a)(2) consultation measures. The four DPSs occur wholly in the jurisdiction of the United States, and we are able to identify areas that meet the definition of critical habitat. Therefore, because none of the circumstances enumerated in our regulations at 50 CFR 424.12(a)(1) have been met and because the Secretary has not identified other circumstances for which this designation of critical habitat would be not prudent, we have determined that the designation of critical habitat is prudent for the four DPSs of the foothill yellow-legged frog.

Critical Habitat Determinability

Having determined that designation is prudent, under section 4(a)(3) of the Act we must find whether critical habitat for the four DPSs of the foothill yellow-legged frog is determinable. Our regulations at 50 CFR 424.12(a)(2) state that critical habitat is not determinable when one or both of the following situations exist:

(i) Data sufficient to perform required analyses are lacking, or

(ii) The biological needs of the species are not sufficiently well known to identify any area that meets the definition of "critical habitat."

When critical habitat is not determinable, the Act allows the Service an additional year to publish a critical habitat designation (16 U.S.C. 1533(b)(6)(C)(ii)).

We reviewed the available information pertaining to the biological needs of the four DPSs of the foothill yellow-legged frog and habitat characteristics where the four DPSs are located. A careful assessment of the economic impacts that may occur due to a critical habitat designation is still ongoing, and we are in the process of working with the State and other partners in acquiring the complex information needed to perform that assessment. Therefore, due to the current lack of data sufficient to perform required analyses, we conclude that the designation of critical habitat for the four DPSs of the foothill yellow-legged frog is not determinable at this time. The Act allows the Service an additional year to publish a critical habitat designation that is not determinable at the time of listing (16 U.S.C. 1533(b)(6)(C)(ii)).

Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

(1) Be logically organized;

(2) Use the active voice to address readers directly;

(3) Use clear language rather than jargon;

(4) Be divided into short sections and sentences; and

(5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*), need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the *Federal Register* on October 25, 1983 (48 FR 49244).

Government-to-Government Relationship with Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. We solicited information from all of the Tribes within the entire range of the foothill-yellow-legged frog to inform the development of the SSA report, and we notified Tribes of our upcoming proposed listing determination. We also provided these Tribes the opportunity to review a draft of the SSA report and provide input prior to making our proposed determination on the status of the foothill yellow-legged frog, but we did not receive any responses. We will continue to coordinate with Tribal entities throughout the listing process for the foothill

yellow-legged frog.

References Cited

A complete list of references cited in this rulemaking is available on the Internet at *http://www.regulations.gov* and upon request from the Sacramento Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this proposed rule are the staff members of the Fish and Wildlife Service's Species Assessment Team and Field Office staff within the range of the species in California and Oregon.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

AUTHORITY: 16 U.S.C. 1361-1407; 1531-1544; and 4201-4245, unless otherwise noted.

2. Amend § 17.11(h) by adding entries for "Frog, foothill yellow-legged [Central Coast DPS]", "Frog, foothill yellow-legged [North Feather DPS]", "Frog, foothill yellow-legged [South Coast DPS]", and "Frog, foothill yellow-legged [South Sierra DPS]" to the List of Endangered and Threatened Wildlife in alphabetical order under AMPHIBIANS to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
* * * * * * *				
AMPHIBIANS				
* * * * * * *				
Frog, foothill yellow-legged [Central Coast DPS].	*Rana boylii*	California (All foothill yellow-legged frogs in the Central Coast Range south of San Francisco Bay to San Benito and Fresno Counties).	T	[*Federal Register* citation when published as a final rule]; 50 CFR 17.43(g)[4d]
Frog, foothill yellow-legged [North Feather DPS].	*Rana boylii*	California (All foothill yellow-legged frogs in the North Feather River watershed largely in Plumas and Butte Counties).	T	[*Federal Register* citation when published as a final rule]; 50 CFR 17.43(g)[4d]
Frog, foothill yellow-legged [South Coast DPS].	*Rana boylii*	California (All foothill yellow-legged frogs in the Coast Range from Coastal Monterey County south to Los Angeles County).	E	[*Federal Register* citation when published as a final rule].
Frog, foothill yellow-legged [South Sierra DPS].	*Rana boylii*	California (All foothill yellow-legged frogs in the Sierra Nevada Mountains south of the American River sub-basin south to the Transverse Range in Kern County).	E	[*Federal Register* citation when published as a final rule].
* * * * * * *				

3. Amend § 17.43 by adding a paragraph (g) to read as set forth below:

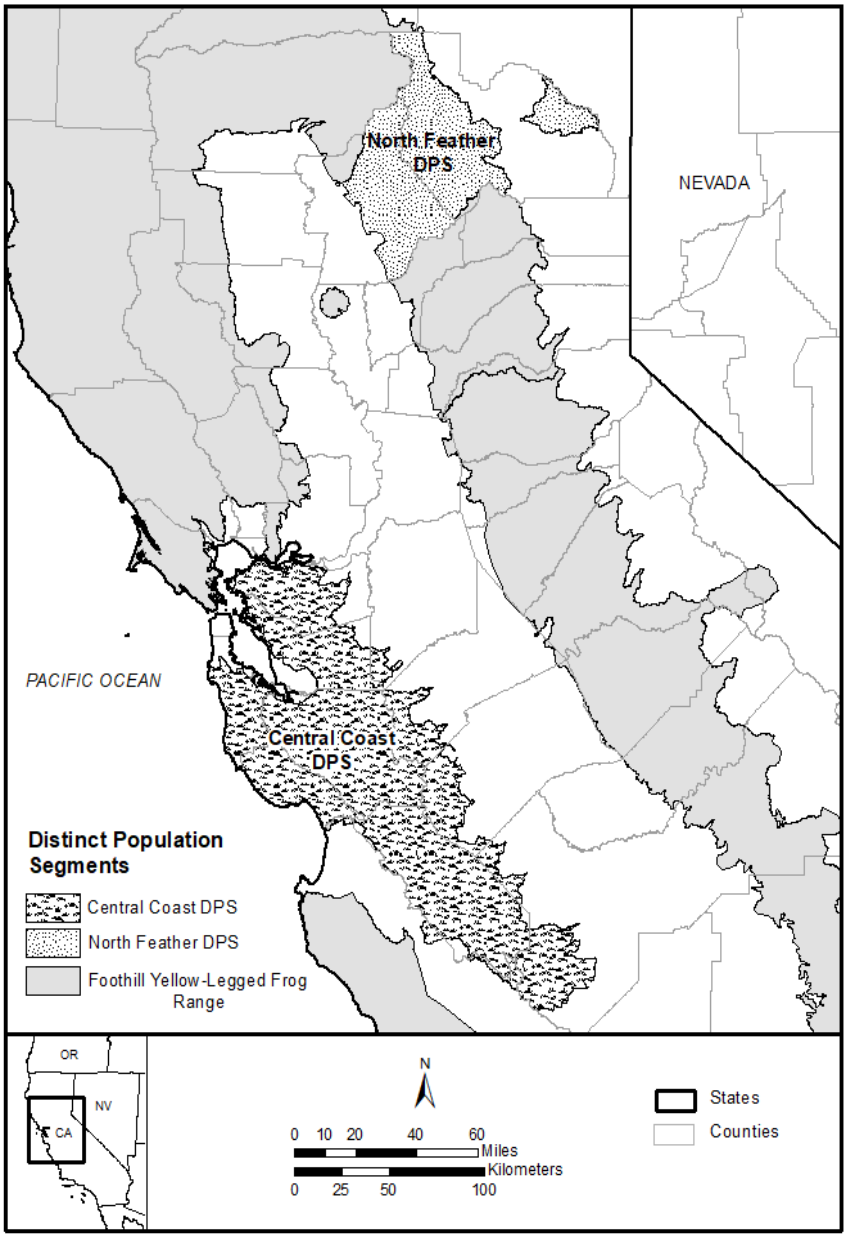
§ 17.43 Special rules—amphibians

* * * * *

(g) Foothill yellow-legged frog (*Rana boylii*), Central Coast Distinct Population Segment (DPS) and North Feather DPS.

(1) *Location*. The Central Coast DPS and North Feather DPS of the foothill yellow-legged frog are shown on the map that follows:

Figure 1 to paragraph (g)



(2) *Prohibitions.* The following prohibitions that apply to endangered wildlife also apply to the Central Coast DPS and North Feather DPS of the foothill yellow-legged frog. Except as provided under paragraph (g)(3) of this section and §§ 17.4 and 17.5, it is

unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or cause to be committed, any of the following acts in regard to this species:

(i) Import or export, as set forth at § 17.21(b) for endangered wildlife.

(ii) Take, as set forth at § 17.21(c)(1) for endangered wildlife.

(iii) Possession and other acts with unlawfully taken specimens, as set forth at § 17.21(d)(1) for endangered wildlife.

(iv) Interstate or foreign commerce in the course of commercial activity, as set forth at § 17.21(e) for endangered wildlife.

(v) Sale or offer for sale, as set forth at § 17.21(f) for endangered wildlife.

(3) *Exceptions from prohibitions.* In regard to the Central Coast DPS and North Feather DPS of the foothill yellow-legged frog, you may:

(i) Conduct activities as authorized by a permit under § 17.32.

(ii) Take, as set forth at § 17.21(c)(2) through (c)(4) for endangered wildlife.

(iii) Take as set forth at § 17.31(b).

(iv) Take incidental to an otherwise lawful activity caused by:

(A) Forest management activities as approved by the Service for the purposes of reducing the risk or severity of catastrophic wildfire, which include fuels reduction activities, non-emergency firebreak establishment or maintenance, and other non-emergency wildfire prevention and suppression activities that are in accordance with an established forest or fuels management plan and that include measures that minimize impacts to the species and its stream habitat.

(B) Habitat restoration efforts as approved by the Service that are specifically designed to provide for the conservation of the foothill yellow-legged frog's habitat needs and include measures that minimize impacts to the species and its habitat as approved by the Service. Habitat restoration efforts for other species that may not share habitat

requirements (e.g., salmonid species) are not included in this exception unless approved by the Service.

(C) Efforts as approved by the Service to remove and clean up trespass cannabis cultivation sites and related water diversion infrastructure and restore areas to precultivation conditions.

(D) Removal or eradication of nonnative animal species including, but not limited to, American bullfrogs, smallmouth bass, and nonnative crayfish species occurring within stream reaches unoccupied by the foothill yellow-legged frog within the range of the Central Coast DPS or North Feather DPS as approved by the Service.

(v) Possess and engage in other acts with unlawfully taken wildlife, as set forth at § 17.21(d)(2) for endangered wildlife.

Martha Williams,
Principal Deputy Director,
Exercising the Delegated Authority of the Director,
U.S. Fish and Wildlife Service.

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